THE FRUIT OF THE TREE

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An Argument on Behalf of Man's Primitive and Natural Diet

BY

CHARLES W. FORWARD.

" Right and wrong are in the nature of things. They are not words and phrases. They are in the nature of things, and if you trangress the laws laid down, imposed by the nature of things, depend upon it you will pay the penalty."—LORD MORLEY.

" If any one can convince and show me that some action of mine is wrong, I will cheerfully change: I seek the truth, which never hurt any man. What hurts is persisting in self-deceit and ignorance."—MARCUS AURELIUS.

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INTRODUCTION

It is over forty years since I first became interested in the subject of diet as a factor in health and disease, and, therefore, as bearing directly upon the happiness of mankind.

During the early years of my life, my health was in a precarious state, I had lost two sisters and a brother in infancy, and my early recollections were associated with frequent consultations with medical men. Moreover, the frailty of my constitution was such that I was precluded from taking part in the recreations of boys of my own age, or following seriously any course of study.

At about the age of sixteen I was led, by a quotation from Cullen,[1] to doubt the necessity of flesh-food, and, on fuller consideration of the subject, I resolved to abandon the use of butchers' meat entirely. My decision aroused the opposition of my parents, and it was generally predicted that, if I persisted in my folly, it could have no other result than to put a period to my existence.

In the meantime, I had become so firmly convinced of the error of flesh-eating that I determined to continue the practice I had adopted, and I found it comparatively easy to demolish the various arguments which were brought to bear on me.

I pointed out the obvious fact that there exists in the flesh-eating community a very large percentage of sickly and delicate persons ; that it was from the ranks of flesh-eaters that the numerous population of our hospitals, infirmaries and asylums was recruited ; and that

[1] In Sir Richard Phillips' *Million of Facts*.

there was no guarantee that, in the event of my resumption of the habit of flesh-eating I should be any freer from ailments than I had hitherto been, or that the flesh-eating community around me appeared to be.

About this period I was induced to sign a proposal form with a view to taking out an Insurance Policy on my life. I underwent the usual examination at the hands of Dr. Symes Thompson, at whose recommendation the Company declined to accept me. After I had abstained from butchers' meat for several years another Company insured me as a second-class life, and later, after 25 years abstinence, the Legal and General Insurance Company accepted me as a first-class life.

Although I persevered in my heresy my health did not suffer as a result. Apart from the hours necessarily devoted to earning a livelihood, I spent no small portion of my time in writing and lecturing upon the principles of health and dietetics in various districts of England, Scotland and Wales. This work entailed an expenditure of energy, mental and physical in excess of what was needed for ordinary business pursuits, and, at times, involved long and fatiguing journeys, irregular meals, late hours and curtailed rest.

Yet, I can certainly state that, whilst, as might be expected, from the original delicacy of my constitution, I have never attained robust health, I have suffered but little and have been comparatively free from the numerous ailments which affect so many of those persons who follow the usual customs in regard to diet, and partake freely of flesh-food.

Believing as I do that breaches of Nature's laws are the cause of disease, it has appeared to me an illusion to depend on drugs in the treatment. The rational plan would seem to be an attempt to discover what conditions brought about a departure from health. Disease would

appear to be not so much an entity as a derangement of function, and the true physician is he who seeks to ascertain to what breach of natural law it owes its origin in particular cases.

" If," remarks Bacon, " physicians, leaving generalities for a while, and suspending their assent, would advance towards nature, they might become masters of that art of which the poet speaks :—

> " Et quoniam variant morbi, variabimus artes
> Mille mali species mille salutis erunt."

. . . I find great repetition but little new matter in the writers of physic."

A physician who adopts these principles will not, however, win the support of the general public. Patience and water gruel do not make a strong appeal to the average invalid, and it needs an Abernethy to tell a wealthy patient to : " Live on sixpence a day, and earn it."

" Nothing offends patients more," writes Dr. Alexander Bryce, " than to be asked to change their habits of life. Their desire is to be able to break every known law of health ; and when they are called upon to pay the penalty, they accept complete absolution in a bottle or two of medicine.

" They do not want to be cured, but are content to be patched up sufficiently to continue their practice of self-indulgence in its various forms."[1]

I am not concerned as to what extent the principles set forth in the various chapters of this book may prove acceptable to the majority of readers. I have endeavoured to state what I believe to be sound physiological truths affecting the welfare and happiness of mankind. These principles appear to me to be fundamentally sound, and to constitute a far safer guide to health and

[1] *Intestinal Toxæmia*, p. 132.

longevity than is to be found amongst the ever-shifting sands of medical speculation. They possess, moreover, this recommendation, that they are not put forward, like so many so-called " principles " with a view to justify or palliate the existing habits of the community.

Indeed, they run counter to those habits to a degree that will almost certainly render them inacceptable to that large section of society which prefers to follow a well-trodden path than to think or act upon its own initiative. To follow the line of least resistance is the tendency of most of us. As Matthew Arnold puts it :—

" Most men eddy about
Here and there, eat and drink,
Chatter and love and hate,
Gather and squander, are raised
Aloft, and hurled in the dust,
Striving blindly, achieving
Nothing, and no one asks
Who or what they have been.

" But there are some whom a thirst
Ardent, unquenchable fires
Not with the crowd to be spent
Not without aim to go round
In an eddy of purposeless dust ;
Ah ! yes, some of us strive
Not without action to die
Fruitless, but something to snatch
From dull oblivion."

It is this latter small proportion of the community to whom this book will, I hope, appeal.

I am conscious that the manner in which the subject is presented leaves much to be desired, as I have had to write the various chapters in moments snatched at random, and in the midst of other occupations and distractions. I felt, however, that if I delayed writing to a more convenient season when I had abundant leisure, I might never have written it at all.

My primary aim has been to promote a clear understanding of certain principles which underlie the science of human dietetics, and are thus of vital importance to

the human race, I have endeavoured, moreover, to state these principles in language simple and clear enough to be appreciated by readers who have not enjoyed the advantage of scientific training.

My own extended observation of many persons whom I have met, who have modified their dietary, either out of deference to a conviction that such a course was expedient as a means of securing and maintaining health, or, from a sense of moral duty, has convinced me that their health was certainly in no way injured, but, that, on the contrary, they were actually better, as a result of their avoidance of flesh-food. Many of them, have, in fact, overcome a constitutional delicacy similar to that which I was afflicted, and several have reached very advanced ages.

This is not less remarkable when the fact is stated that the dietary adopted by these persons was not often based upon any ascertained scientific principles, and was, in many instances (apart from the exclusion of flesh-food), by no means ideal from a physiological point of view, or carefully regulated either as to quality or quantity.

Acceptance of the principles of humaneness,—the inspiring force which induces some persons to abstain from foods which can only be obtained by bloodshed and violence,—does not necessarily carry with it a consideration of the character of the dietary in its relation to the physiological needs, and it has been characteristic of many adherents to the cause of humaneness that they have shown themselves indifferent upon this point.

If, therefore, all the disadvantages attendant upon the adoption of a non-flesh dietary as recited above, have not stood in the way of many persons confining themselves exclusively to such a regime ; and, if, in spite of these drawbacks, such persons have been enabled to live long, useful and happy lives, comparatively free from the nu-

merous ailments associated with civilized life, how much might be expected to follow a real return to Nature by the substitution of food which bears a definite relationship to man's physiological needs, and the departure from which has exercised so disastrous influence upon his health and well-being, besides inflicting untold sufferings upon countless millions of animals. The so-called " lower animals " are subject to the same physiological laws as man ; but, in their case, the limitations set by their natural instincts and their physical capabilities operate against any wide divergence from natural law.

Instinct directs them to seek their sustenance from those sources to which their constitution is adapted. It is not easy for them to change the character of their food, nor can they submit it to artificial heat, or other chemical process before they consume it.

Man's intellectual powers have enabled him to depart from his natural food, and to make use of a wide variety of animal and vegetable foods, prepared in innumerable different ways to suit his vitiated palate, or to meet the economic and commercial exigencies of civilized life.

But man's nature remains unaltered. Anatomically and physiologically he is what all the great naturalists declare him to be,—a *frugivore*, or fruit-eating animal. And, departure by him from his natural diet brings in its train results identical with those that would follow any similar departure on the part of other animals.

" Every excess in eating and drinking, every unnatural call upon our digestive powers, leaves some mark, invisible, perhaps, on our reserve of power."[1] Unnatural and artificially prepared food deprives man of many elements essential to health, gives rise to the formation of poisons in the system, unduly accelerates

[1] Dr. T. Bodley Scott.

the action of the heart, increases the pressure upon the arteries and capillaries, and engenders a variety of disorders.

The evils associated with the unnatural habit of flesh-eating are widespread. Every practical individual protest against what is, at best a relic of barbarism, will diminish the volume of those evils, and tend to the advancement of that day when, as the prophet visualizes, "they shall not hurt nor destroy in all My holy mountain, for the earth shall be full of the knowledge of the Lord as the waters cover the sea."

Chapter I

THE GOLDEN AGE OF TRADITION

"And God said, Behold I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; and to you it shall be for meat."—*Genesis* 1, 29.

Recognition of the importance of diet in its bearing upon human character and thought is by no means a modern development. From the earliest ages of history, the connexion existing between purity of life and spiritual development has been embodied in the doctrines of those great leaders of thought who have sought the advancement of mankind.

Gautama Buddha, Empedocles, Plato, Pythagoras, and other founders of religious systems and schools of philosophic thought, men who refused to be distracted or diverted from the pursuit of their ideals by any considerations of a temporal character, and who, in the search for truth, were prompted by the unselfish desire of promoting the real and permanent welfare of the human race, have made a special point of the necessity of adopting certain rules of life as a means to that end.

Amongst such rules, and, perhaps, the first of them, was a renunciation of the use of flesh-food. Their disciples were enjoined to sustain themselves upon the purest and simplest forms

of food, purity of life and tenderness of heart being insisted upon as the accompaniments of a higher life. Neither violence nor bloodshed was to be involved in the procuring of food, and the slaughter of harmless creatures for the purpose of consuming their bodies was strongly deprecated.

Nor is it less remarkable that remote traditions should be associated with the idea of a "Golden Age," in which man abstained from the flesh of his fellow-creatures and subsisted upon the fruits of the earth. It has been suggested that the so-called Orphic Societies, originating about the eighth or seventh century B.C., were the first associated efforts to inaugurate in the West the revolt from sacerdotal practices involving slaughter and cruelty.

These societies claimed the legendary Orpheus as their founder, and it is reasonable to conjecture that the preference for a purer diet exemplified in the *Works and Days* of Hesiod, derived its origin in part from the literature associated with the name of Orpheus.

Hesiod pictures the Age of Gold, the Age of Silver, and the Age of Brass, the latter involving a declension from the pure habits of diet which distinguished the two earlier Ages.

In the sixth century, B.C., Pythagoras made abstinence from flesh-food an important tenet

of his school and forbade the offering of slain victims in sacrifice, substituting cakes and fruits in their place.

The plausibility of the stock arguments in favour of luxury is delightfully satirized in Plato's *Republic* (*Book II*). In discussing the origin of a social state Socrates suggests :

" They (the artisans and workpeople generally) will live, I suppose, on barley and wheat, baking cakes of the meal, and kneading loaves of the flour ; and spreading these excellent cakes and loaves upon mats and straw, or on clean leaves, and themselves reclining on rude beds of yew or myrtle boughs, they will make merry, themselves and their children, drinking their wine, weaving garlands, and singing the praises of the gods, enjoying one another's society, and not begetting children beyond their means, through a prudent fear of poverty and war.

" Glaukon here interrupted me, remarking : ' Apparently you describe your men as feasting, without anything to relish their bread.' "

" ' True,' I said ; ' I had forgotten. Of course, they will have something to relish their food. Salt, no doubt, and olives, and cheese, together with the country fare of boiled onions and cabbage. We shall also set before them a dessert, I imagine, of figs, pease, and beans ; they may roast myrtle berries and beech nuts at the fire, taking wine with their fruit in moderation. And thus, passing their days in tranquillity and sound health, they will in all probability live to an advanced age, and, dying, bequeath to their children a life in which their own will be reproduced.'

" Upon this Glaukon exclaimed : ' Why, Socrates, if you were founding a community of swine, this is just the style in which you would feed them up.'

" ' How, then,' said I, ' would you have them live, Glaukon ? '

" ' In a civilised manner,' he replied. ' They ought to recline on couches, I should think, if they are not to have a hard life of it, and dine off tables, and have the usual dishes and dessert of a modern dinner.'

" ' Very good ! I understand. Apparently we are considering the growth, not of a city merely, but of a luxurious city. I daresay it is not a bad plan, for by the extension of our inquiry we shall, perhaps, discover how it is that justice and injustice take root in cities. Now, it appears to me that the city we have described is the genuine and, so to speak, healthy city ; but if you wish us also to contemplate a city that is suffering from inflammation there is nothing to hinder us. Some people will not be satisfied, it seems, with the fare or the mode of life which we have described, but must have, in addition, couches and tables and every other article of furniture, as well as viands. . . . Swineherds, again, are among the additions we shall require—a class of persons not to be found, because not wanted, in our former city, needed but among the rest in this. We shall also need great quantities of all kinds of cattle for those who may wish to eat them, shall we not ? "

" ' Of course we shall.'

" ' Then shall we not experience the need of medical men also to a much greater extent under this than under the former *regime* ? '

" ' Yes, indeed.'

" ' The country, too, I presume, which was formerly adequate to the support of its then inhabitants will be now too small, and adequate no longer. Shall we say so ? '

" ' Certainly.'

" ' Then must we not cut ourselves a slice of our

neighbour's territory if we are to have land enough for both pasture and tillage ?—while they will do the same to ours if they, like us, permit themselves to overstep the limit of necessaries, and plunge into the unbounded acquisition of wealth.'

" ' It must inevitably be so, Socrates.'

" ' Will our next step be to go to war, Glaukon, or how will it be ? '

" ' As you say.' "

The Roman poet Ovid in his *Metamorphoses XV* remarks :

" That age of old, to which we have given the name of golden, was blest in the produce of the trees and in the herbs which the earth brings forth, and the human mouth was not polluted with blood.

" Then the birds moved their wings secure in the air, and the hare, without fear, wandered in the open fields. Then the fish did not fall a victim to the hook and its own credulity. Every place was void of treachery ; there was no dread of injury—all things were full of peace. In later ages some one—a mischievous innovator whoever he was—set at nought and scorned this pure and simple food, and engulfed in his greedy paunch meats made from a carcase."

Virgil, in his *Georgics*, eulogises the Golden Age

" before the impious human race slaughtered their labouring oxen."

Plutarch assumes the habit of flesh eating to be a sign of man's departure or fall from his natural state :

" I, for my part, wonder of what sort of feeling, mind, or reason, that man was possessed who was first to pollute his mouth with gore, and to allow his lips to touch

the flesh of a murdered being ; who spread his table with the mangled forms of dead bodies, and claimed as daily food and dainty dishes what but now were beings endowed with movement, with perception and with voice.

" For the wretches who first applied to flesh-eating may justly be alleged in excuse their utter resourcelessness and destitution ; inasmuch as it was not to indulge in lawless desires, or amidst the superfluities of necessaries, for the pleasure of wanton indulgence in unnatural luxuries that they betook themselves to carnivorous habits."[1]

Pope, in his *Essay on Man*, compares the condition of primitive man with that of his civilized descendants :

" Pride then was not, nor arts, that pride to aid ;
Man walk'd with beast—joint tenant of the shade.
The same his table, and the same his bed ;
No murder cloth'd him, and no murder fed.
In the same temple, the resounding wood,
All vocal beings hymn'd their equal God ;
The shrine with gore unstain'd, with gold undrest,
Unbrib'd, unbloody, stood the blameless priest :
Heaven's attribute was universal care,
And man's prerogative to rule, but spare.
Ah ! how unlike the man of times to come !
Of half that live the butcher and the tomb ;
Who, foe to nature hears the general groan,
Murders their species, and betrays his own.
But just disease to luxury succeeds,
And ev'ry death its own avenger breeds ;
The fury passions from that blood began,
And turn'd on man a fiercer savage—man."[2]

[1] *Essay on Flesh-eating.*
[2] *Essay on Man*, Epis. iii.

In this connexion the Mosaic cosmogony is worthy of more than passing note. It seems extraordinary that in the conception of the creation as described in the first chapter of the book of Genesis, man should be portrayed not as a hunter or a shepherd, using—as did the Israelites of Moses' time,—a mixed dietary in which the flesh of animals played a part ; but as coming from the hand of the Creator adapted to the innocent and bloodless diet supplied by the produce of a garden.

The story of the fall of man as narrated in the second chapter of the book of Genesis may be taken as constituting one of the grandest conceptions of the human mind.

Differing, as it does, from the account contained in the first chapter both as to the details of the narrative and the method of treatment, it is actually supposed to have been written several centuries earlier, viz., about the eighth or ninth century before our era.

The story of a message from his Creator, which was either misconveyed or misunderstood by man, is not peculiar to the Hebrews or Babylonians. There are clear traces of a similar idea to be found in the folk-lore of various races.

Thus the Namaquas or Hottentots have a story of a hare that was sent by the Moon with a message which he perverted to man's

undoing. The Moon charged him to go to mankind and say, "As I die and rise to life again, so shall you die and rise to life again," but out of either forgetfulness or malice the message as delivered ran, "As I die and do not rise to life again, so you shall also die and not rise to life again." When the Moon heard that a wrong message had been delivered she was so angered that she threw a stick at the hare and split his lip, which explains the fact that the hare's lip is cloven to the present day.[1]

According to W. H. I. Black and L. C. Lloyd,[2] the Bushmen have a similar story with slight variations, the hare being a human sceptic who for doubting the gospel of eternal life was turned into a hare.

The Nandi of British East Africa portray the messenger as a dog who purposely perverted the message of immortality owing to his dignity having been wounded by the treatment he received.[3] Finding the people to whom he was to deliver the message drinking milk out of a gourd and beer through a straw, he requested that he should participate, instead of which they merely served him with milk and beer to drink off a stool. "If only people had given that dog a gourd to drink milk out

[1] *Expedition of Discovery into the Interior of Africa*—Sir J. E. Alexander.
[2] *Specimens of Bushmen Folk-lore* (*London*. 1911).
[3] *The Nandi*—A. C. Hollis (Oxford, 1909).

of, and a straw to suck beer through, we should all have risen from the dead, like the moon, after three days."

The Ekoi of Southern Nigeria believe that messages respectively of immortality and mortality were dispatched by a duck and a frog, but that the duck so far forgot himself as to stop on the journey to gobble up a quantity of palm oil, with the dire result that the frog delivered his message to the effect that man is mortal, whilst the duck's message was never delivered.[1]

The above are only a few amongst many stories that might be quoted, and similar myths are common in many parts of the African Continent, Bechuanaland, Basutoland and Zululand.

The gist of the story of the fall—" Of man's first disobedience, and the fruit of that forbidden tree "[2]—as told in Genesis appears, according to the suggestion of Sir James Frazer, to be an attempt to explain man's mortality, to set forth how death came into the world. It is true that man is not said to have been created immortal and to have lost his immortality through disobedience, but neither is he said to have been created mortal. Rather we are given to understand that the possibility

[1] *In the Shadow of the Bush*—P. Amaury Talbot (London, 1912).

[2] *Paradise Lost*—Milton.

alike of immortality and mortality was open to him, and that it rested with him which he would choose, for the tree of life stood within his reach, the fruit was not forbidden to him, he had only to stretch out his hand, take of the fruit, and eating of it, live for ever.[1]

The whole narrative of the fall of man is set round the Tree of the Knowledge of Good and Evil. The picture is made up of this Tree with the man and the woman and the serpent. "But," says Sir James Frazer, "when we look closer we perceive a second tree standing side by side with the other in the midst of the Garden. It is a very remarkable tree, for it is no less than the tree of life whose fruit confers immortality on all who eat of it. Yet, in the actual story of the fall, this wonderful tree plays no part. Its fruit hangs there on the boughs ready to be plucked; unlike the tree of knowledge, it is hedged about by no divine prohibition, yet no one thinks it worth while to taste of the luscious fruit and live for ever. The eyes of the actors are all turned on the tree of knowledge, they appear not to see the tree of life.

One may suppose that in the original story, upon which the writer of the second chapter of Genesis bases his narrative, there were two trees, a tree of life and a tree of death; that it

[1] *Folk-lore of the Old Testament.*

was open for man to eat of the one and live for ever, or to eat of the other and die ; that God out of goodwill to his creature, advised man to eat of the tree of life, and warned him not to eat of the tree of death, and that man, misled by the serpent, ate of the wrong tree and so forfeited the immortality which his benevolent Creator had designed for him.

The error of Adam would seem to be repeated in the lives of most of us were we wise enough to apply the allegory. There are two paths open to every man and woman. The one is so broad and smooth that we almost unconsciously allow ourselves to drift into it. It may be described as the line of least resistance, the sheep-like plan of following where others lead. The other involves determination, resistance to and possibly conflict with established custom. It necessitates closing one's ears to the wiles of the serpent. Is it to be wondered at that most men are to be found upon the first of these two paths ? There is a description, in one of Henri Fabre's wonderful chapters, of the processional caterpillars with whom the principle of " follow my leader " is an ineradicable instinct. Long processions are to be seen in a line, the head of one closely following the tail of another, so that wherever the leader goes they all go. The principle might be an excellent one if the leader possessed

superior faculties to justify his leadership. But he really possesses no such faculties. In fact, if we remove him from the head of the column and place him at the tail he merely follows the caterpillar in front of him and the next in order takes his place as leader. Fabre wondered how far this passion for blindly following another would go, and he placed a complete circle of processional caterpillars on the edge of a large circular vase, so that there was no break in the continuity of the circle and no actual leader. The caterpillars, true to their instinct, marched round and round for hours, and it never occurred to one of them to strike out for himself and break the circle. It was only after a very long time that some of them stopped from actual exhaustion.

Is not human life epitomised in this experiment with the processional caterpillar? How few amongst us ever stop to consider our daily habits, or refuse to accept what custom enjoins!

"But," it may be asked, "is there any reason why we should take the difficult and uncharted path whilst the broad and well-trodden path is open to us?" This is a very natural question, and it is not difficult to answer.

If for the idea of immortality we substitute that of a long life perfectly rounded-off with

freedom from the ills that flesh is not heir to, but brings upon itself by breaches of God's laws—this, at the least, is a realizable ideal for mankind. The Tree of Life stands in the midst of the Garden. There are no angels with flaming falchions to drive us from it; the choice lies with ourselves. We are at liberty, as far as out intelligent understanding of the laws of life enables us, to obey these laws and to reap the untold advantages that accrue as a result, in the shape of that health and good estate which are above infinite riches.

Or, we may turn from the Tree of Life to the Tree of Death, following the multitude to do evil, outraging our nature, and ignoring or defying God's laws. Here and there one may see cases where this is apparently done with impunity. Here and there one may meet with those who seem to escape paying the penalty in physical illness or premature death. But, taking men and women *en masse*, how few, how very few, do so escape. And what millions there are who constantly suffer from some ailment or another, and who maintain that vast army of doctors, chemists, nurses, patent-medicine proprietors, etc., and innumerable hospitals, sanatoria, nursing homes, and similar institutions.

Truly man has suffered for his error in choosing the Tree of Death rather than the

Tree of Life. Yet during the space of twenty-five centuries how many have attempted to understand the allegory of the fall ?

There is at least plentiful ground for speculation as to why the tradition of an age of innocence appears so persistently both in sacred and profane literature. One is tempted to ask what hidden meaning was intended to be conveyed by the specific details as to the original diet of mankind, details all the more remarkable in that they ran counter to the prejudices and customs of the age in which they were written.

What was the " Tree of Life," and what significance could the " fruit of a tree," and the subsequent permissive, but, none the less restrictive regulations of the Mosaic law, possess for a people who had become accustomed to flesh-eating and bloody sacrifices ?

Nor is it less strange that the idealism of comparatively modern writers—also living in a community where flesh-eating was customary—should have led them, almost unconsciously, to the conclusion that a diet involving bloodshed was incompatible with man's higher development.

Sir Thomas More clearly recognised the demoralising influence of butchery and the extent to which it was incompatible with an ideal State, for he pictures the laws of "Utopia"

as " permitting not their citizens to accustom themselves to the killing of beasts ; through the use thereof they think clemency, gentlest affection of our nature, by little and little to decay and perish." Though his conception does not rise to the point of abolishing the slaughterhouse, he relegates the work of slaughtering to the bondsmen, or citizens who had been deprived of their rights as such for criminal offences.

Amongst modern writers may be mentioned Dr. B. W. Richardson, who, in his *Salut-Land*, describes the ideal community as having banished the butcher and slaughterman :—

" Throughout all the country the land is under cultivation of the most perfect kind for cereal produce and fruit and vegetables. . . A man, woman, or child who, for wanton pleasure, should hunt down or torture one of the inferior creatures would be cast out of society ; while the idea of having dumb animals killed and hung up in open shops to bleed and be quartered and cooked for human beings to live on would be treated with disgust."

Mr. Blatchford in *The Sorcery Shop* makes his Socialist State vegetarian :—

Mrs. Lascelles and her daughter came out and asked their guests if the lunch had been to their liking.

" It was magnificent, thank you, madam," said Jorkle.

" Especially the curry," the General remarked, and added that he supposed it was a vegetable curry.

" Naturally," replied the hostess.

" Hah, to be sure," said the General, " I mean that you had put no meat into it."

" Meat ? " said Mrs. Lascelles, with a look of surprise. " What is meat ? "

The General looked at Mr. Fry, who said, " The General has been much abroad, and is learned in Eastern spices." Then with a meaning glance at Sir Frederick, he said, " Meat is unknown here."

In his *A Modern Utopia* Mr. H. G. Wells remarks :

" In all the round world of Utopia there is no meat. There used to be. But now we cannot stand the thought of slaughterhouses. And, in a population that is all educated, and at about the same level of physical refinement, it is practically impossible to find anyone who will hew a dead ox or pig. We never settled the hygienic aspect of meat-eating at all. This other aspect decided us. I can still remember as a boy the rejoicings over the closing of the last slaughterhouse."

Many other instances might be quoted in which men and women who themselves adopted the carnivorous habits of the community in which they lived, have been inspired with an ideal incompatible with the continuance of such habits. This fact alone cannot fail to impress any who look at the question from an unprejudiced standpoint. If flesh-eating cannot be reconciled with the conception of an ideal world its abolition from our midst must be the first step in the true progress of humanity.

Chapter II

HOW A FRUIT-EATING ANIMAL BECAME A FLESH-EATER

"We can only infer . . . . its mode of life, and how it (the Neanderthal species) won, and for a time held its place in the European fauna, and guess at the way in which a herbivorous animal, accustomed to dealing with very hard food which wore down the crowns of its teeth, an animal of forest, and more remotely, of arboreal ancestry, poorly endowed, moreover, with mechanism for communication, came eventually to live in caves, to eat the flesh of animals it had killed and cooked over a fire, and to develop a form of social life."

Modern Man and His Forerunners—SPURRELL.

There is general accord amongst scientific authorities that the human species with its various races represents a family of the Primates, and evidence points to the existence at former epochs of other species that are now extinct.

Monkeys are almost entirely frugivorous, though *Macacus cynomolgus*—the crab-eating macaque of the Malay littoral—is an exception, and apes are reported known to eat insects and the eggs of birds, whilst according to some naturalists, they will occasionally eat small birds and mammals.

The fact, however, remains that the natural food of the ape consists of fruits and the tender shoots of trees and shrubs, and the question arises, how the descendant of an

arboreal, fruit-eating animal came to adopt a flesh diet.

Writers on evolution attribute the development of man to the change that at one period, probably the Oligocene, took place in the habits of his remote ancestor. It must not be supposed that the adoption of a flesh diet would in itself have furthered the evolution of the species. The quickening of the faculties depended rather upon the necessity imposed of searching for food, of cultivating the senses of sight and hearing, of discriminating between varieties of animals, the means of attack and defence, the best means of snaring and killing them, etc.

The earliest men of whose habits we have been able to obtain any knowledge were hunters. A simian ancestor living near the northern limits of a tropical forest, during an unusually severe winter, and his usual food supply having become greatly restricted, would probably, under the stress of hunger, turn to any available source.

" It will not be," writes F. W. H. Migeod, " until through famine he has acquired flesh-eating propensities and has grown to like the taste of flesh, and added it to his normal vegetarian diet, that to satisfy his appetite he will proceed of his own accord to the attack. One cannot imagine him, on the whole, very

successful beyond getting grubs or frogs, or even small rodents, until he has acquired some mechanical skill. For long ages, therefore, Proto-man and *Homo Primogenius* must have remained vegetarian for the most part. This is abundantly proved by the skulls of *H. Primogenius* which have been unearthed. The teeth are all uniformly worn down by the mastication of hard vegetable products."

The artificial taste, once having been created, it would follow that the coveted food was sought and that, in the process of seeking it the erstwhile arborean had perforce to become a terrestrial animal. It is to this change of habit that evolutionists attribute the adaptation of man's frame to walking and running, in which exercises he possesses an undoubted advantage over the ape with his shuffling gait, assisted in the case of the larger anthropoids by the use of the arms and knuckles.

The gradual adoption of stones and sticks, and, subsequently, of shaped clubs and weapons, diminished the dependence on the jaws and teeth, which thus became less developed, bringing as a result a modification in the shape of the skull. Exercise of the reasoning faculties in connexion with the search for and capture of prey would increase the size of the brain.

In addition to the development of the

observing and reasoning faculties imposed upon the individual by the search for food, the carnivorous habit as it grew would necessitate attacks upon larger and stronger animals, and would bring about co-operation of several individuals thus engendering sociability. Carveth Read[1] remarks that nothing accounts for our present character as men except the early formation of the hunting pack, and Galton points out how readily the proceedings of man and dog are intelligible to one another. "As the man understands the thoughts of the dog, so the dog understands the thoughts of the man, by attending to his natural voice, his countenance, and his actions."[2]

The hunting propensity would appear to be the most prominent *nexus* between man and dog.

Though man does not appear at any time to have adopted a dietary exclusively carnivorous in character, it is a striking fact that, apart from the restraint of rules and ordinances imposed by religious belief, the human race appears almost everywhere and at all times to have subsisted partially upon animal food in the form of the flesh of men or other animals. In countries where vegetable food was scarce and the climate inhospitable, as in the Arctic

[1] *The Origin of Man.*
[2] *Inquiries into Human Faculty.*

circle and Patagonia, man has depended upon the chase, whilst, under more favourable skies where the hand of nature was lavish and vegetable food plentiful he has subsisted almost entirely upon the direct produce of the soil supplemented in varying degree with the flesh of animals. It was upon a vegetarian diet that the thickly populated districts of the East depended.

Industrial development and the facilities offered by the discovery of cold storage have served to establish the habit of flesh-eating in civilised communities, which, since the application of steam power to transportation, are no longer content to depend upon local supplies of food, but draw their sustenance from distant sources. The change—as was demonstrated during the war of 1914-19—has not been an unmixed advantage, inasmuch as it involves the risk of starvation in the event of a blockade.

The development of the hunting propensities would have enabled man's early ancestors to extend far beyond the tropical or sub-tropical regions of the earth. In such regions as these the food supply must have been at times very precarious, and history affords many instances in which migration of tribes has taken place as a direct result of an insufficiency of food. As writers on economics have pointed out, a

hunting population required a wide area and was incompatible with any densely populated settlement.

Agriculture and the domestication of certain animals would have naturally followed at a later stage of man's development. Where the parent animals were killed in the chase, their young would easily be captured alive, and their domestication would offer many advantages, as flocks and herds are capable of being driven from place to place and accompanying their owners in their migrations, whereas, a tribe could not uproot its seed-corn, or other edible plants, and carry them away in bulk when threatened by an enemy. Domesticated flocks of sheep and goats would also supply wool and hair for clothing, and domesticated birds could be depended upon for eggs and meat, when other sources temporarily failed. The use of milk would follow later, and from milk, turned sour, or accidently shaken in transport, man probably learnt how to make cheese and butter.

All these departures from the arboreal life could not fail to develop man's mental faculties, and to promote the growth of a communal spirit. The deftest hands would be devoted to the shaping of flints and manufacture of rude weapons for attack and defence, the swiftest legs and strongest arms would be

allocated to the pursuit and capture of prey. The women would collect edible herbs, roots, fruits and berries and undertake the preparation of the food and the care of children and domestic animals.

It has already been remarked that the activity of the mental faculties essential to a hunting life must have played an important part in the enlargement of the brain. The capacity of some of the oldest specimens of pre-historic skulls is remarkable as compared with those of modern men.

Thus, whilst the cranial capacity of the larger anthropoids averages 500 c.c., Pithecanthropus has been estimated at 900 c.c., the Australian aboriginal 1,200 c.c., Euanthropus 1,400 c.c., and the modern English skull at 1,500 c.c., a Neanderthal skull has been measured at 1,600 c.c.

To a mind free from prejudice it is not easy to understand the horror excited in the minds of flesh-eating men and women at the idea of cannibalism. Carnivorous animals such as wolves do not hesitate to devour the carcase of a dead comrade, and a number of human tribes have been known to eat the bodies of enemies slain in battle. The aversion from bloodshed is a separate matter and applies to the killing of animals other than one's fellow men. The slaughter of animals for food in

civilized communities is usually done by proxy. Few of us would have the hardihood to eat mutton if we first had to kill the sheep with our own hands, and the word " butcher " is an opprobrious epithet capable of being applied to an exceptionally callous murderer, or a ruthless conqueror. But where the battlefield is strewn with dead, or supplies run short in a closely besieged fortress, it is scarcely logical for the man who eats dead pig to sneer at the famished warrior who has to choose between starvation and anthropophagy. For the simple faith of the South Sea Islander that Providence sends the missionary for his stew is not widely separated from the mental attitude of the carnivorous apologist who pleads that God sends cattle and sheep for *him* to kill and eat.

Even the cannibal is not always the low-minded scoundrel that self-complacent sarcophagists would have us believe.

" I daresay," writes Mr. Hume Nisbet, " to outsiders the idea of a cannibal is unexpressibly shocking and revolting ; but, after living amongst them and discovering in them the same traits of honesty, honour, and even chivalry as might have been found in the beef and mutton-eating knights of old, this feeling of horror dies away ; and we can understand how a people may be cannibal through long

custom and tradition without being innately more ferocious than the peaceful citizen who buys his steak or chop at the humane-looking, good-tempered butcher round the corner."

Garallo de Vegas[1] in his *History of the Incas of Peru* states that in some provinces, " they would suck the blood as it ran from the wounds of the dying man ; they had public shambles of man's flesh, and their madness herein was to that degree, that they spared not their own children which they had begot on strangers taken in war, for they made their captives their mistresses, and choicely nourished the children they had by them till about thirteen years old ; they butchered and ate them, and they served their mothers after the same fashion when they grew past child-bearing and ceased to bring them any more children."

In the *Decline and Fall of the Roman Empire*[2] Gibbon states that "a valiant tribe of Caledonia, the Attacotti, the enemies and afterwards the soldiers of Valentinian, are accused by an eye-witness of delighting in the taste of human flesh.

It is pointed out by P. L. Simmonds that cannibalism has existed almost universally among races living in a savage state, sometimes as a means of subsistence, as among the Mon-

[1] Quoted by Locke : Essay on Government (sect. 57).
[2] Twenty-fifth chapter.

bouttons and some other African tribes, where shambles for human flesh are openly kept; sometimes with the idea of appropriating to themselves the qualities of the deceased; and he quotes a letter from Dr. Harvey to the effect that "a large number of the inhabitants of the Fiji Islands are savages of the worst character. They are cannibals to a fearful extent; habitually feeding on human flesh, not from revenge, nor from necessity, but because they prefer it to other food. They eat their enemies or prisoners when they can, but if unsuccessful in catching these, their lawful prey, they will cook their own wives and children.

In the country of the Balétéla one saw neither grey-haired persons, halt, maimed or blind. Even parents were eaten by their children on the approach of the least sign of old age. Under such circumstances the Balétéla are a splendid race. After a fight, the native camp-followers invariably ate up all the dead, leaving absolutely nothing for the jackals.[1]

Captain Cook confirmed the reports as to cannibalism being the almost universal practice of the races in the Pacific Islands. A provision basket was seldom seen without having in it a human head or other evidence of the fact.

[1] Capt. Hinde, at meeting of the British Association. Reported in the *Globe*, Sept. 16th, 1895.

The chief of the Swedish relief expedition to Samara, in south-east Russia, wires to M. Branting, Swedish Prime Minister, as follows : " There are places in the hunger district where the people are in such wretchedness that it leads to madness. They have already begun to eat the corpses of the dead. They now begin to kill people to eat them.[1]

Meat-eaters who claim for their unnatural habits the force of custom will have no difficulty in satisfying themselves that there is plentiful evidence that anthropophagy is a not less time-honoured custom. Both are undoubted relics of barbarism.

[1] *Evening Standard*, Jan. 23rd, 1922.

Chapter III

THE NEMESIS OF WRONG-LIVING.

"I have for some years past been compelled by facts which are constantly coming before me, to accept the conclusion that as much mischief in the form of actual disease, of impaired vigour and of shortened life, accrues to civilized man, so far as I have observed in our own country and throughout almost every part of Europe, from erroneous habits of eating as from the habitual abuse of alcoholic drink, considerable as I know the evil of that to be."—Sir Henry Thompson.

It is difficult to contemplate without concern the effects of civilized life upon the physical condition of the human race. Although it may be admitted that there are individual instances of physical strength and vitality comparable with any well-attested cases of past times, these instances are exceptional, and constitute no criterion as to the general standard of the community, so that a careful study of the question will leave little ground for optimism.

"The perfectly healthy man," writes Dr. Alexander Bryce, "is the exception and not the rule in this country. And even when we encounter one who offers himself as an example of perfect health and strength, ten chances to one if we do not discover that he fails in one or other important condition. In all probability we shall discover that he suffers from slight constipation, necessitating, let us say, a pill or a dose of salts occasionally or a nightly dose of paraffin. Further enquiry

would elicit the fact that he suffers from one or two colds in the head each year, that he has an attack of lumbago every year or two, rheumatic pains at times, a headache and a " run down " feeling now and again with a fit of extreme mental depression fairly frequently. . . . . More than probably he is absent from business an average of ten days or a fortnight each year despite his weekly half-holiday, his Sunday rest and his seven nights in bed.[1]

The evidence as to the physical degeneration of the race came out in a very disturbing form in connexion with the selection of recruits during the European war, but, although much concern was expressed at the time, public interest in this important subject of inferior physique would seem to have dwindled, if it have not actually died out.

In *An Analysis of the Physical Defects among the General Male Population*, Dr. John D. Comrie, M.A., M.D., etc., gave a summary of the physical condition and defects found in 10,000 recruits whom he examined while President of No. 1 Area Recruiting Medical Board.[2] In this report Dr. Comrie states that only 20 per cent. of the male population between 20 and 41 were free from noteworthy physical defect. The further fact emerges that

[1] *Intestinal Toxæmia*, p. 161.
[2] *Lancet*, Nov. 29th, 1919.

between the ages of 18 and 23 years a rapid deterioration of physique occurs in the male population of this country. Whilst three men out of four were fit for general military service at the age of 18, only two out of four remained fit at the age of 23. At the age of 18 Dr. Comrie found the teeth generally sufficiently good for practical purposes, although frequently, even then, the upper incisors were beginning to decay. With advancing age the state of the teeth became progressively worse, and, of the sample 10,000 recruits, 928 had artificial teeth, whilst another 1,120 were urgently in need of them.

In a report issued by the Minister of Pensions, it is stated that, " only one man in three was found to be normally healthy, and one man in ten was a physical wreck."[1]

In Leeds, 1,000 men, " instead of yielding seven companies of fighting men, can only give H.M. Forces barely three companies." In the same town seven men out of ten were *hors de combat* before they shouldered a musket.

" We are faced with the fact that a tenth of our young manhood is physically useless for either civil or military occupation, and drags out, at the expense of others, a crippled and enfeebled existence."[2]

[1] The Physical Examination of Men of Military Age by National Service Medical Boards.

[2] *Morning Post*, Feb. 28th, 1920.

Out of 1,877 cases at Salford only 8 per cent. showed no disability. Weedy and anæmic young men crowd our cities and are worn out at 45. The farm labourer who has an excellent physique at 20 is middle-aged at 40, and a victim to varicose veins, defective feet and rheumatism.

The only portions of the globe unaffected by the ravages of consumption are those which civilization has not yet penetrated.[1]

"Our hospitals, infirmaries, poor-houses, and mad-houses," writes Dr. Morison[2] "are filled with diseased objects. Before they have attained half their natural age, the young are swept away, or grow up diseased and profligate. Much care has been taken and great means employed to instruct their minds; but we forget to instruct them as to the treatment of their bodies."

"So bad are the teeth of our countrymen," writes the editor of the *Medical Press*, "that it would require an army of some 30 or 40 thousand dental surgeons to cope with them. Nine-tenths of the dental disease among us is preventable.

Writing in the *Nineteenth Century*, Mr. Arthur S. Underwood declares that "dental caries is more prevalent among English-

[1] Sir Robert Philip at Paris Tuberculosis Conference. *Morning Post*, Oct. 19th, 1920.

[2] Quoted by Dr. Russell, *Medical Philosophy*.

speaking and other civilised races at the present time than it has ever been in the world's history. It is at least ten times as common in England and America to-day as it was even 150 years ago. Its prevalence is in direct proportion to the degree of civilisation, and has always been so at all times of the world's history. . . . It is due principally to the widespread and spreading system of artificial feeding of infants.'

That the consumption of butchers' meat, should bring about an increase in the diseases of the heart and blood vessels is not surprising.

"When you eat a piece of beef, and the nourishment from that beef enters your blood," writes Mr. J. H. Oliver, "you also get the cow's waste matter as well. The work of your eliminative organs is increased. They have now to get rid of the cow's waste matter as well as your own! Thus, the heart of a man who eats meat beats ten times a minute more than that of a man who doesn't. Just try to realise what this means with the flight of time. Imagine your heart beating 600 times an hour more than mine does, 14,400 times a day! And yet this is actually the case with many meat-eating friends of mine. Can you wonder that, in the course of time this vital organ proves unequal to the unnatural strain, that it becomes prematurely old, and breaks down under it."[1]

[1] A Practical Treatise on Diet and Hygiene.

Lady Paget, in an article in the *Nineteenth Century*, estimated the number of heart beats in a meat-eater as seventy-two per minute as compared with fifty-eight in a non-meat-eater. This would work out at 20,000 additional heart beats in twenty-four hours. The aggregate work of the human heart in twenty-four hours can only be expressed in huge figures. G.N. Stewart[1] calculates that the normal daily work of the two ventricles as about 22,000 kilogramme-metres, which is enough to raise a weight of 6lbs. from the bottom of the deepest mine in the world to the top of the highest mountain, or to raise the man himself to twice the height of the spire of Strasburg Cathedral. These figures are based on a normal heart with a systolic arterial pressure of 120 mm. Hg., but pressure may be as high as 200 to 240 mm.

According to Dr. Aug. Waller, the daily work of the heart may be estimated as nine hours, the resting period being fifteen hours. A heart working only eight hours is a good one, and a heart working thirteen hours is unsatisfactory. The resting periods of the heart consist of the pauses between the beats, hence a heart that does not beat too rapidly gets most rest.

Dr. de Haviland Hall, who may be considered one of the first authorities on both arterio-sclerosis, and on the life-insurance

[1] *A Manual of Physiology*, A. Waller, M.D.

aspect of that disease, says that though the average duration of life has considerably increased during the last fifty years, *there has been an actual increase in the mortality rate among males between the ages of forty-five and sixty-five ;* and that between the ages of fifty-five and sixty-five one-third of the total deaths are due to disease of the heart and blood vessels.

Bourgignon says that " arterio-sclerosis, formerly regarded as a ' normal malady ' of old persons, is becoming every day more and more precocious. The arterio-sclerotic of forty years of age is no longer a rarity."

" That one of the kinds of arterio-sclerosis is due to excessive, or relatively excessive, feeding with meat and wine, and that this kind is caused by a persistence of high arterial pressures, as opposed to von Basch's opinion that the high pressures were the consequences of the arterio-sclerosis, has been my opinion from the first."[1]

Nor is the prospect less appalling if we turn to the condition of the infant population. Out of a million babies born in London, 860,000 survive the first year, 791,000 survive the fourth year. The mortality steadily falls until the eleventh year ; thereafter it steadily rises until the fifteenth year. Out of the original million 700,000 are alive at thirty-five, 600,000

[1] *Diseases of the Arteries*, Sir Clifford Allbutt.

at fifty, 500,000 at fifty-eight, 400,000 at sixty-five, 100,000 at eighty, 15,000 at ninety, while 154 live to reach a hundred years.

Improved sanitation has exercised a favourable influence, for the death-rate from scarlet fever has fallen from 1,200 per million in 1840, to 77 per million in 1914 ; and, in the ten years from 1900-10, " the expectation of life at birth rose from 40.98 years to 46.78 for males, and from 45.33 to 51.41 years for females.

The Census Bureau of the United States estimates that at least 300,000 babies die annually and that one-third of the children born die by the age of 15.[1]

" In the last four years, in the United States, 3,000,000 little feet have ceased pattering. This is not an idle statement made in a year of sensations. Its proof is found in the mortality statistics prepared by the Bureau of Census."[2] The question as to how far this appalling state of affairs is a necessary accompaniment of civilized life, and how far it arises from preventible causes is of the deepest interest. In a recent lecture by Sir Malcolm Morris, he remarked that, " during fifty years in the medical profession he had often asked himself how much of the sickness that still abounded was avoidable, gratuitous, self-incurred. It

[1] Transactions of the American Pediatric Society.

[2] *The Science of Eating*, Alfred McCann.

was his deliberate opinion, after much pondering, that at least 75 per cent. of it was the penalty inflicted by the nature of things for violations of the elementary laws of health, violations which consisted in carelessness, in neglect, in folly, in excess of all kinds."[1]

Civilized man has diverged so far from his natural habits that he cannot be viewed as a normal being. Many of his acquired habits are detrimental to his health and vitality, and none more so than his deviation from nature's laws in regard to his food. Comparative anatomy shows him to belong to the frugivora, and it is only by living in accordance with natural law that he can be considered and studied physiologically as a normal being.

" Are we to believe," says a writer in the *Medical Press*, " that the shocking prevalence in this country of adenoids, enlarged tonsils and rhinitis, and the numerous ills which follow in their train, are a necessary evil, only to be cured by surgical means ? Common sense should tell us that the prevalence of these disorders must be due to some faulty environmental conditions, and we should never tire in our endeavour to find out what those conditions are. Supinely to permit these diseases to ravage the community reflects little credit upon our profession. For my part I am convinced

[1] *Morning Post*, Dec. 3rd, 1920.

that their frequency is the result of our pernicious system of feeding our children.[1]"

"For this condition (gastritis) about 100 tons of bismuth are given each year in the United Kingdom," according to a rough estimate made by Dr. D. A. Crow, who remarks that "it is a cheerless reflection, that as a profession we still administer remedies rather than remove an obvious cause.[2]"

Dr. Leonard Williams remarks: "Here is a community of civilized individuals whose members to the extent of 85 per cent. suffer chronically, from the cradle to the grave, from diseases and disorders of the buccogastro-intestinal tract. They suffer from dental caries, adenoids and tonsils, dyspepsias, pancreatic and hepatic disorders, appendicitis, and constipation, and the long tract is dotted and punctuated with malignant disease. What is the cause? Now, if I were to state this problem to anyone with a scientific training I venture to say that his instant reply would be "Inquire into the dietetic habits of this community, and correct some error which must be staring you in the face."

"Man has degenerated—this degeneration is due solely to his diet. He has fallen; but we hope that he has risen to the highest point

[1] Dec. 24th, 1919.
[2] *Pyorrhœa Alveolaris.*

in the art of shortening his days, and that in the present generation he will commence to gradually fall back on his original and ordained diet."[1]

Dr. J. Watkin Edward remarks :—" The enormous increase in the consumption of animal food is a phenomenon of the present generation, and the good problematical. To our forefathers, meat was almost a stranger, except on one or two days a week, and there is no conclusive proof that they were any the worse on that account. Similarly the workers of France and Germany, the coolies of China, the natives of Japan, are able to perform prodigious tasks on a diet into which meat enters not at all or in relatively small quantities."

Sir James Paget estimated that twenty million weeks of time are annually lost in England and Wales on account of sickness alone This is equivalent to four hundred thousand years, or incapacity through illness of four hundred thousand persons between the ages of fifteen and sixty. It is not to be inferred that the same persons are ill for a whole year. The proportion is maintained by the place of one who recovers being taken by another falling ill.

But this number, appalling as it is, does not include the large proportion who though not actually incapacitated from work are in defec-

[1] *Can We Prolong Life*—C. W. de Lacy Evans.

tive health and who find it necessary to resort to stimulates and narcotics. The enormous trade in proprietary medicines of all kinds supplied through chemists, drug-stores, grocers and other retail tradesmen is supported by people whose health is below the normal.

" Everywhere, in all ages," wrote Canon Kingsley, " as far as I can ascertain, has man been inventing stimulants and narcotics to supply that want of vitality of which he is so painfully aware. . . . . He knows usually that he is not what he ought to be ; that he carries about with him, in most cases, a body more or less diseased and decrepit, incapable of doing all the work he feels that he himself can do."

It would seem that the process of degeneration is not confined to the physical condition of civilised communities, for " one out of every 250 of the population in England is officially described as a lunatic ! One of every five criminals is a lunatic ! Two of every three in inebriate homes are feeble-minded. These figures are but a finger-post pointing thoughtful minds to a ghastly future. The medical inspection—not trained nurse inspection—of school children is bringing a sad state of affairs to the surface. The mentally defective children—about 150,000 in England—will beget an army of insane.[1]"

[1] " Sterilization " by Dr. Rentaul in *Canadian Practitioner*.

Dr. Forbes Winslow declares: "Every carnivorous animal is a born criminal by instinct, every bird, like the eagle and vulture, who lives upon meat can be classed in the same category. It is a well-recognised fact that those invalids who are sustained on raw meat, which is the case with some, soon become very bad-tempered—in fact, often lose all power of control over themselves."

"Meat no doubt stimulates the animal passions, and often converts a human being into a brute, and excessive indulgence in the same is often the cause of serious crime.[1]"

"Criminal statistics," writes Dr. R. V. Kraft-Ebing, "prove the sad fact that sexual crimes are progressively increasing in our modern civilization. This is particularly the case with immoral acts with children under the age of fourteen. . . . . The medical investigator is driven to the conclusion that this manifestation of modern social life stands in relation to the predominating nervous condition of later generations, in that it begets defective individuals, excites the sexual instinct, leads to sexual abuse, and with continuance of lasciviousness associated with diminished sexual power induces perverse sexual acts."[2]

The "nervous condition" referred to is undoubtedly brought about largely by the use

[1] *Evening News*, Oct. 20th, 1909.
[2] *Psycopathia Sexualis*, pp. 498-499.

of stimulating and unwholesome foods and drinks.

In discussing the use of scopolamine-morphine in childbirth, Dr. W. Osborne Greenwood quotes Sir Arthur Newsholme's remark that " all the facts point to the conclusion that volitional limitation of the family is the chief and vastly predominant cause of the decline in the birth-rate which is taking place in so many countries " ;[1] and Dr. Greenwood states his opinion that the " fear of parturition is a very potent factor in the decline of the birth-rate, as anyone who goes to the trouble of inquiring will very quickly discover." " The reason," he continues, " is simple. *In no civilized nation can parturition be regarded as a ' normal physiological process.'* It is an event looked forward to with misgiving, and, moreover, fraught with tremendous pathological possibilities." Yet parturition is naturally a normal physiological function, and, as has been remarked, it is as natural for a woman to bear children as for an apple tree to bear apples. Moreover, parturition is still a normal physiological process in less civilized nations.

It has usually been attempted to establish a science of physiology by observing the phenomena of pathology, to ascertain what constitute the vital processes under normal conditions by

[1] *The Declining Birth-rate*, p. 33.

a study of these processes when deranged or disturbed by abnormal conditions. The effect of flesh-eating in accelerating the heart's action has already been referred to, and it is obviously a false conclusion to base the physiological action of the heart in a frugivorous animal by the action of that organ when a departure from normal conditions has taken place. A similar remark applies to the fæces, the physiological reaction of which, in vegetable eating animals is acid, as it is also in the case of human beings who eat no flesh-food. If butchers' meat be eaten an alkaline reaction occurs, but this, in a frugivorous animal, is abnormal and is produced as a result of an unnatural diet. The urine on the other hand has an alkaline reaction in the frugivora and herbivora, and an acid reaction in the carnivora. In civilized man using butchers' meat it is acid, whereas normally it should be alkaline, a condition to which it tends to revert when man returns to his natural diet. These aberrations from the normal are typical, and there can be no doubt that a variation in the nature of the dietary exercises an influence upon the general metabolism of the body, and may well be the most potent cause of the diseased and disordered condition of civilized man.

That general adaptability which enables man and other animals to deviate from their natural

habits is functional, and not organic. Anatomically man is as well adapted to a diet of fruit as his forerunners were countless centuries ago. He is not fitted structurally for a flesh-diet, and the present diet of civilized man is a hotch-potch of every conceivable kind of mess that the depravity of the cook and the chemist, or the cupidity of the manufacturer can produce.[1]

If evidence is required of the connexion between habits of diet and the health of the individual it is to be found in the fact that there exist in flesh-eating communities persons who have effected a marked improvement in their health by abandoning the use of flesh-food. Numerous instances might be quoted in which the substitution of a more natural,—though not always an ideal dietary,—has been followed by a restoration to health after all other means have failed.

All the expedients of the authorities in the shape of Public Health Acts, Insurance Acts, Welfare and Maternity Centres, etc., will do little towards preventing physical degeneration so long as the people themselves remain ignorant of the first principles of health, or refuse to apply them in their own lives.

[1] "In twenty-six months I was able to obtain forty-seven convictions in the courts against meat-packers, sausage-manufacturers and wholesale provision merchants for selling deodorised rotten meats and meat products, chemically treated so as to disguise from the unsuspecting purchaser their true condition." *The Science of Eating*, Alfred McCann.

Chapter IV

THE LAW OF ADAPTATION

"For whatsoever purpose each thing is constituted, thereto it tends; and whereto it tends there lies its end; and where its end is, there too is each thing's gain and good."

Marcus Aurelius.

In the course of any general survey of the universe around him, no thoughtful man can fail to be impressed by the manifestation of definite laws, subject to, and in accordance with which, the whole of Nature, as we know it, exists.

Astronomy teaches us that the sun is the centre of the solar system; that the earth upon which we live, and the various planets move around the sun in their different orbits, regulated by fixed laws; that, even the apparently erratic courses of the comets may be traced so accurately that it is possible to tell the exact day upon which their re-appearance in any particular part of the firmament will take place.

Geology has taught us that the changes which take place in the earth's surface, and in the configuration of the various continents result from the operation of laws equally fixed; whilst the sister science—Palæontology, enables the story of vegetable and animal life to be unravelled, and that of man himself to be

written from Nature's records extending back far beyond the dawn of recorded history.

Since the publication of Newton's *Principia*, the laws of Physics have been developed to a remarkable degree, and many modern inventions have owed their inception to a closer acquaintance with physical laws. The science of Chemistry, too, has made remarkable advances during the past 250 years, advances which were only possible because of the recognition of fixed and unalterable laws.

All but the very ignorant recognise the fact that laws exist throughout Nature ; none but the exceptionally wise take any trouble to apply the principle to their own bodies, functions, and habits of life.

Man is prone to consider himself as being in a class apart from other animals.

" Fifty years ago," writes Dr. F. Wood Jones, " even an ardent evolutionist would feel no difficulty in keeping as a mental reservation the belief that, though no doubt the lesser beasts had been subject to the laws of gradual change, Man was aloof from all this and was a divine, a special, and a perfected creation. This mental reservation is, not unnaturally, prevalent to-day."[1]

" Man is not content," declares Broca, " to be the king of animals. He insists on having

[1] *Arboreal Man.*

it that an impassable gulf separates him from his subjects. The affinity of the ape disturbs and humbles him. And turning his back upon the earth, he flies, with his threatened majesty, into the cloudy sphere of a special 'human kingdom.' But Anatomy, like those slaves who followed the conqueror's car crying, 'Thou art a man,' disturbs him in his self-admiration, and reminds him of those plain and tangible realities which unite him with the animal world."

As the late Howard Moore so aptly expresses it, "A dog, a frog, a philosopher and a worm cannot for a long time after their embryonic commencement be distinguished from one another. Like the oyster, the ox, the insect, and the fish, like all that live, move and breathe, man is mortal."[1]

The clergyman who delivers so eloquent a sermon upon the wisdom and beneficence of the Creator, as manifested in his works, would not dream of feeding his favourite dog upon lettuce leaves and apples, or give beef steaks to his horse, because—as he would explain—such are not the foods to which each of the animals in question is respectively adapted by Nature.

This same clergyman will be loath to believe or to admit the possibility that his own ail-

[1] *Universal Kinship.*

ments, and those of his family are in any way associated with their habits of life. Nor will he listen patiently to anyone who endeavours to persuade him that he, like his dog and horse, and in common with all living beings, is constitutionally adapted to a particular form of sustenance, and that in his case, as in the case of other animals, a departure from natural law must necessarily be followed sooner or later by disordered function and disease. The medical practitioner, if he have carefully studied comparative anatomy—as he should have done—knows that it is possible to decide as to the kind of food adapted to each animal by consideration of its general anatomical structure, and particularly by an examination of the teeth and digestive apparatus. Were he asked to decide from an examination of its anatomical structure what was the natural food of an ape, he would reply that it belonged to the order of *frugivora*, or fruit-eating animals. He will, however, seldom be induced to apply the same reasoning to his own structure. Indeed, in his determination not to be turned aside from his acquired habits, he will not hesitate to declare, in direct opposition to his logical conviction, and to the unbiassed opinions of all the great comparative anatomists, that man is an omnivorous animal, possessing digestive organs suitable for a mixed

diet of flesh and vegetable food, and able, in fact, to eat what pleases his palate, whether of animal or vegetable origin.

No animal exists of which it can be truly stated that it is adapted to a mixed diet of cooked flesh and vegetable foods. Those who defend the dietetic habits of civilised life declare that man was intended to make use of the superior intelligence which serves to differentiate him from other animals. There must have been a long period in the history of the human race, during which man was unacquainted with the use of fire, and had, perforce, to subsist upon uncooked food as other animals do. The 'superior intelligence' which enabled man to utilise artificially prepared foods, also brought upon him innumerable diseases—the direct result of a departure from natural law.

It seldom or never occurs to a medical man that the very profession he adorns is the outcome of a departure from natural law, or that the illness and disease he sees on every side, and from which he himself is by no means immune, is nothing other than a resultant product of certain infractions of Nature's laws. He is, in fact, a part of the community upon whose misfortunes he depends, he shares and perpetuates the same prejudices, falls into the same errors, indulges in the same habits, suffers

from the same diseases, and dies not less prematurely.

Indeed, the existence of the physician in a civilized community is, of itself, an anomaly, for if the question were asked, " What is the function of a physician ? " ninety-nine persons out of every hundred would reply, " The function of the physician is to heal the sick, and to cure disease." Sickness and disease, however, constitute the penalty which man pays for his departure from natural law, and the doctor is not called in to point this fact out, or to exhort the sufferer to live in accord with Nature's laws. He is expected to concur in, and to condone the offence, and, by the exercise of some special skill and knowledge, with which he is credited but does not actually possess, to enable the law breaker to escape the penalty.

" If a carpenter falls sick," remarks Plato, " he asks the doctor for a ' rough and ready cure—an emetic, or purge, or a cautery, or the knife—these are his remedies.' Should anyone prescribe for him a course of dietetics, and tell him to swathe and swaddle his head, and all that sort of thing, he says ' he sees no good in a life spent in nursing his disease to the neglect of his customary employment ; and therefore, bidding goodbye to this sort of physician, he resumes his ordinary habits, and either gets

well and does his business, or if his constitution fail, he dies and has no more trouble."[1]

The laws of the universe are, nevertheless, fixed and determinate, and no one can escape from the results of their operation. And, although he may labour under the illusion that, in regard to his own habits of life Nature's laws are more elastic and extensible, and the dire results of any breach of those laws less certain to follow in his own case, man ultimately pays the penalty of his error, by suffering or by a premature death.[2]

One of the difficulties which stand in the way of man's due appreciation of the certain evils that follow any breach of these physiological laws which apply to and govern his life and happiness, is, that, in most cases no *immediate* warning is given him as to the risk to which he is exposing himself by adopting injurious habits. He is taught in his early years by example and precept, to follow the habits of his parents, or those amongst whom his youth is spent, and any latent natural instincts are modified or destroyed in the course of time, until he never doubts the foods and drinks which he has grown to like, and to depend

[1] Dialogues, iii, 93, 4 (Jowett's Edition).

[2] " Man is an animal, though nowadays he is disposed completely to subordinate the physical to the intellectual side of his nature. He cannot do so without paying the penalty of a badly-nurtured, ill exercised body, prone to ailments."—Dr. Leonard Hill.

upon, and which are easily accessible to him, are best suited for his sustenance. Nor, when ill-health follows years of wrong habits, can man be induced to associate the effect with the cause. He finds it more agreeable to his self-love to attribute disease to causes outside his control and apart from himself, and, in a measure beyond his guidance, preferring to fly to some form of medical treatment which directs its aim to the mitigation or amelioration of the *symptoms* than to the removal of the *causes* of his troubles. This unphilosophical outlook characterises the vast majority of the human race, and makes it difficult to arouse any lasting or general interest in the true relationship of health and disease.

It is sometimes suggested that Science will ultimately succeed in abolishing disease. It is scarcely conceivable that Science can do more than mitigate some of the worst results of departure from Nature's laws. Science will best aid mankind by ascertaining and expressing the laws upon which life depends, and the degree in which failure to observe these laws is almost inevitably followed by disease and suffering.

When man is brought to understand that his body is a machine infinitely more complex in construction, and more delicately adjusted than any human invention, he will, perhaps,

see the advantage of giving attention to the laws which govern its action. "It is estimated," writes Dr. Leonard Hill, "that in the liver alone there are 350 milliards of cells, supplied by 100 milliard blood capillaries; every drop of blood the size of a small pin's head contains some four or five millions of red corpuscles, each carrying out its allotted function. Should not the vision of such wonderful mechanism, before which the most delicate, the most intricate machine ever devised by man becomes in comparison a clumsy contrivance, bring home more perfectly the realisation of the nature of the temple which our souls inhabit and enforce the lesson of striving to keep it holy by simple habits of life rather than encompassing its impoverishment and destruction by daily violation of physiological laws."

There is no part of any mechanism constructed by man that cannot be replaced when worn out or injured, but the vital parts of the human mechanism, the heart, the blood vessels, the digestive organs, the kidneys, etc., cannot be replaced, and with their breakdown the whole machine becomes useless. Reasonable compliance with the laws which govern their action will enable the various bodily organs to perform their functions smoothly and easily for a period well over a century.

In applying, then, as we must logically do, the laws of Nature to man as a physical being, it is essential that we should clear our minds of all misconception as to his ability to break away from or ignore those laws with impunity.

Chapter V

ADAPTABILITY *versus* ADAPTATION

"I suppose that men may, generally, be like other creatures, aware, by sense or instinct, of those things which are for their good, when the simplest conditions of their existence are undisturbed. But these are not the conditions in which we live. Men have disturbed, in successive generations, almost every simple and original condition of their existence. In every generation they have been striving, with intellectual labour, to add to the comforts and luxuries of life, to their control of the forces, and their independence of the ordinary course of nature. And many of their successes in this strife, being achieved by the disturbance of some natural and fit condition of mere subsistence, have almost necessarily incurred some consequent evils, which have marred, though they may not have neutralized, the good and have gradually accumulated to our damage."

The Study of Physiology, Sir James Paget.

There is no fact more easily verified by observation than the adaptation of living organisms to the particular substances from which, under natural conditions, they obtain the necessary elements for their sustenance. This principle will be found of universal application.

In the vegetable kingdom each variety of plant bears a definite relation to the inorganic or organic elements upon which it subsists, some requiring rich soil, and others flourishing upon comparatively poor soil or barren rock; some, again, developing only where moisture is plentiful and others favouring dry and arid situations. It will be evident upon consideration that the adaptation of each plant to its special environment is not merely external,

but that its whole structure is in accord with, and bears a definite relation to, the quality of soil and the amount of heat, of moisture, light, and other conditions.

A similar law operates throughout the animal kingdom, and applies not only to the smallest organisms, but to every living being including man.

All these facts are ascertainable from a superficial examination of the animals in question, but deeper investigation as to the comparative anatomy of the two classes will show that, not only does the external structure of the *Herbivora* and *Frugivora* on the one hand, and the *Carnivora* on the other, demonstrate them respectively, as being adapted to a particular class of food ; but, that the form and functions of the internal organs also bear a definite relationship to their natural diet.

" Adaptation to conditions," writes Mr. H. W. Conn, " is seen in all animals and plants. These organisms are evidently complicated machines with their parts intricately adapted to each other and to surrounding conditions." " The radiant energy of the sun is transformed by plants into chemical energy. It is this chemical energy which feeds the vital activity of animals, who return it to the external world under the form of heat, mechanical work, and muscular contraction, light in

the glow-worm, electricity in the electric eel."[1]

Animals, unlike plants, are unable to derive their sustenance from the mineral kingdom. They depend, in the first instance, upon the vegetable kingdom—grass, herbs, roots, leaves, and fruits, those mammals which feed upon grass, etc., being known as *Herbivora ;* and those whose food consists of fruit, as *Frugivora.*

These two classes differ anatomically, the structure of each being adapted to the particular class of foods upon which it depends. The sheep and ox are obviously adapted for grazing, and the giraffe for biting the tender leaves and shoots of trees, whilst the apes with their climbing proclivities, their anthropoid hands and teeth, and flat nails, are eminently adapted for arboreal life, and plucking and eating fruit.

" The power of the hand grasp has made possible the fore-runners of the Primates, has perfected the evolution of the Primates, and paved the way for the development of man."[2]

Neither of the above groups is in the least degree adapted to the capture or consumption of other animals. The *Carnivora*, on the other hand are ill-adapted for eating vegetable foods, but admirably constructed for the capture of other animals, and for tearing and devouring them.

[1] *Life's Mechanism.*
[2] F. Wood Jones.

MAN'S PLACE IN NATURE.

THE ANTHROPOID APE.	MAN.	THE CARNIVORA.	THE OMNIVORA.
Discoidal placenta.	Discoidal placenta.	Zonary placenta.	Non-deciduate placenta.
Two hands and two feet.	Two hands and two feet.	Four-footed.	Four-footed.
Flat nails.	Flat nails.	Have claws.	Have hoofs.
Walks upright.	Walks upright.	Go on all foures.	Go on all fours.
Without tails.	Without tails.	Have tails.	Have tails.
Eyes look forward.	Eyes look forward.	Eyes look sideways.	Eyes look sideways.
Millions of pores.	Millions of pores.	Skin without pores.	Skin with pores.
Well-developed incisor teeth.	Well-developed incisor teeth.	Slightly developed incisor teeth.	*Very* well-developed incisor teeth.
Blunt molar teeth.	Blunt molar teeth.	Pointed molar teeth.	Molar teeth in folds.
Dental formula :	Dental formula :	Dental formula :	Dental formula :
5.1.4.1.5.	5.1.4.1.5.	*5 to 8.1.6.1.5. to 8.	8.1.2. to 3.1.8.
5.1.4.1.5.	5.1.4.1.5.	5 to 8.1.6.1.5. to 8.	8.1.2. to 3.1.8.
Well-developed salivary glands	Well-developed salivary glands.	Small salivary glands.	Well-developed salivary glands.
Acid reaction fæces.	Acid reaction fæces (on non-flesh diet).	Alkaline reaction fæces.	
Alkaline reaction saliva and urine.	Alkaline reaction saliva and urine (?)	Acid reaction of saliva and urine.	Saliva and urine acid.
Smooth tongue.	Smooth tongiue.	Rasping tongue.	Smooth tongue.
Mammary glands on breast.	Mammary glands on breast.	Teats on abdomen.	Teats on abdomen.
Stomach with duodenum (as second stomach).	Stomach with duodenum (as second stomach).	Stomach simple and roundish.	Stomach simple and roundish, large cul-de-sac.
Intestinal canal 12 times length of the body.	Intestinal canal 12 times length of body.	Intestinal canal 3 times length of the body.	Intestinal canal 10 times length of the body.
Colon convoluted.	Colon convoluted.	Colon smooth.	Intestinal canal smooth and convoluted.
Lives on fruit and cereals.	*Homo sapiens vegetus*—should live on fruit and cereals.	Live on flesh.	Live on flesh, carrion and plants.

Is it sufficient to stop at this point. *The law of adaptation must obviously apply, not only to the external structure, and the digestive and assimilative organs, but to every organ and structure of the body.*

" A living being has but a limited duration. It is born, developed, becomes organised, declines and dies. Through all the metamorphoses of form, of substance and of energy, informing the whole course of its existence, there is a certain co-ordination, a certain harmony which is necessary for the conservation of the individual. This harmony we call Life. Discord is disease—the total cessation of the harmony is Death."[1]

The composition of the blood and other fluids, and of the tissues of a herbivorous animal will necessarily be at its best when formed from the vegetable foods to which the whole structure and organisation of such an animal is adapted ; and that of the blood and tissues of a carnivorous animal will be best when they are derived from the flesh-food to which it is adapted.

It may possibly be objected that the blood of man or any other animal will be found to consist of similar elements whatever the character of the food it subsists upon. From the point of view of pure chemistry this may be so,

[1] *The Mechanism of Life*, Stephane Leduc.

but *the physiological adaptability of the food to the requirements of the animal may, nevertheless, not be complied with.*

Nor, as has already been shown, can the argument be ignored in the case of man. All the great writers on natural history agree that man's structure places him amongst the frugivora or fruit-eating animals.[1] His omnivorous

[1] " Fruits, roots, and the other succulent parts of vegetables appear to be the natural food for man ; his hands afford him a facility in gathering them ; and his short, and comparatively weak jaws, his short canine teeth not passing beyond the common line of the others, and his tuberculous cheek teeth would not permit him either to feed on herbage, or devour flesh, unless these aliments were previously prepared by the culinary process."—Baron Cuvier (1769-1832), Professor of Natural History in the College of France. *The Animal Kingdom*, 1827, Vol. I, p. 88.

" The teeth of man have not the slightest resemblance to those of the carnivorous animals, except that their enamel is confined to the external surface. He possesses, indeed, teeth called canine ; but they do not exceed the level of the others, and are obviously unsuited to the purposes which the corresponding teeth execute in carnivorous animals. The obtuse tubercles of the human molars have not the most remote resemblance to the pointed projections of those teeth in carnivorous animals. Thus we find that, whether we consider the teeth and jaws, or the immediate instruments of digestion, the human structure closely resembles that of the simiæ ; all of which, in their natural state, are completely herbivorous."—Professor William Lawrence, F.R.S. (1785-1867). *Lectures on Physiology and Zoology*, delivered at the Royal College of Surgeons, 1822, pp. 189, 191.

" It is, I think, not going too far to say, that every fact connected with the human organization goes to prove that man was originally formed a frugivorous animal. . . . This opinion is principally derived from the formation of his teeth and digestive organs, as well as from the character of his skin ; and the general structure of his limbs."—Professor Sir Charles Bell, F.R.S. (1774-1842). *Anatomy, Physiology and Diseases of the Teeth*, 1829 p. 33.

" The apes and the monkeys, which man most nearly resembles in his dentition, derive their staple food from fruits, grain, the kernels of nuts, and other forms in which the most sapid and nutritious tissues of the vegetable kingdom are elaborated ; and the close resemblance between the quadrumanous and human

habits are of artificial origin, but his anatomical structure designates him to be a fruit-eater. The result of a departure from natural law may be seen in the number and variety of disorders from which he suffers. Candid writers on anatomy do not overlook the fact that man has departed from what was and still is his natural diet.

" The human machine," writes Prof. Arthur Keith, " has thus come to be supplied with a form of fuel for which its alimentary equipment was never designed. Nature spent millions of years in fitting out a laboratory to deal with the natural refuse of the small bowel ; and now, under modern conditions of diet, we call upon it to perform duties for which it was never intended."[2]

" Many persons assert," writes Sir Herman Weber, " that the teeth and digestive tract of man point to his requiring a large share of flesh-food in his diet. This is by no means in accordance with *fact ;* his teeth, jaws and

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dentition shows that man was, from the beginning, more especially adapted to eat the fruit of the trees of the garden."—Professor Sir Richard Owen, K.C.B., F.R.S. (1804-1892). *Odontography or a Treatise on the Comparative Anatomy of the Teeth*, 1840-1845, p. 471.

" At the period and place, whenever and wherever it was, when man first lost his hairy covering, he probably inhabited a hot country ; a circumstance favourable for the frugivorous diet on which, judging from analogy, he subsisted."—Charles Darwin, LL.D., F.R.S. (1809-1882). *The Descent of Man*, Second Edition, 1874, p. 156.

[2] *Engines of the Human Body*, page 237.

intestines resemble much more those of herbivora than those of carnivora. They are similar to those of monkeys, who thrive better on vegetable than on flesh diet."

" The proper diet for pathological man and old is the natural diet of primitive man. Not the sad satiety of sap and pap with which suffering stomachs are now pseudo-scientifically surcharged, but simple fare and natural, such as man ate in the days of his innocency and simplicity, before pride in his own performances had lost him his perspective and his piety."[1]

The law of adaptation means nothing less than that man's whole physical system down to the smallest detail is based upon his adherence to his natural food. Not only are his hands exquisitely fitted to pluck fruit, his teeth to masticate it, and his digestive organs to prepare it for absorption and assimilation, but all the various organs and tissues of his body are fitted to derive their nutrition, to re-act to the stimuli, and to be sustained upon the elements contained in the fruits of the earth.

According to the Mosaic record the " fruit of the tree " is clearly indicated as man's food, and there is no reference to the art of cookery or the preparation of food by the chemical action of heat. If, however, as the theory of

[1] Leonard Williams, M.D.

evolution suggests, man has evolved from an inferior being, there must, obviously, have been a stage in his development prior to his discovery of the use of fire, when he, or his progenitor, in common with all other animals, subsisted upon uncooked food. Such food, possibly more limited as to variety than at the present day, sustained his physical strength as, to-day it sustains the strength of, not only the elephant, gorilla, camel, horse, reindeer, ox, etc., but many human races.

It is reasonable to enquire whether—and how much—man has gained by substituting the flesh of animals and cooked food in place of his primeval diet.

"If we believe that God has elaborated these substances for our benefit it is little short of sacrilege to disregard them, or to trifle with them, because by so doing we assert our independence of His designs."[1]

It has already been pointed out that—whilst opinions may differ as to the cause—the present state of civilised mankind must excite the gravest concern in the minds of all thoughtful men and women.

Considerable confusion of thought exists between the ADAPTATION of man to a fruit and vegetable diet, and his ADAPTABILITY to other kinds of food. It would seem to be the belief

[1] *The Science of Eating*, Alfred McCann.

of many otherwise intelligent men and women, that adaptability in the matter of food is an attribute which belongs solely to the human race. Such is, however, by no means the fact, as other animals possess a similar adaptability, and, when their natural food is not available, or their natural instincts have become perverted they will partake of food to which they are not physiologically adapted.

A lamb, during a long sea voyage, was induced to live upon the flesh of animals ; and became so habituated to this diet that it finally refused to crop the grass which constituted its natural sustenance.[1]

Herbage being deficient on the coast of Arabia, horses in that part have been fed upon fish and appear to relish this—to them—unnatural diet. The Gauls fed their oxen and horses with fish ; as also did the Pæonians mentioned by Herodotus.[2] In the *Life of Reginald Heber* it is stated that " in Norway, and also in some parts of Hadramant and the Coromandel coasts, the cattle are fed upon the refuse of fish, which fattens them rapidly, but serves, at the same time, totally to change their nature and render them unmanageably ferocious."[3]

It is reported by Diodorus Siculus, that

[1] *Fruits and Farinacea*, J. Smith.
[2] Book, iv., chap. 1.
[3] *Harper's Family Library*, No. 40, p. 363.

Diomedes, King of Thrace, fed his mares with the flesh of miserable strangers, cut in pieces for the purpose ; which made them so fierce and unmanageable that they were obliged to be kept in stalls of brass, and tied up with iron chains.

Cats and dogs, in a domesticated state, may be fed exclusively upon milk and vegetable foods, in place of a flesh diet natural to them as carnivorous animals : and pigs, which are by nature herbivorous, are, at times, fed upon flesh and other unnatural foods. The author has known cats and dogs to eat eagerly banana, pineapple and asparagus.

The kea (*Nestor notabilis*), a large parrot, indigenous to the South Island of New Zealand, though frugivorous by nature, has acquired the habit of killing sheep by alighting on the backs of these animals and digging its beak through the skin and flesh in the region of the kidneys, the surrounding fat being greedily devoured by these birds. There is abundant evidence that under the stress of hunger animals will partake of food different from that which they would choose when able to act in accordance with natural instinct. And it is certain that, in varying degrees, different animals are able to subsist upon a diet which is not strictly in accord with their nature.

Plutarch, remarking on the use of flesh food

by mankind, observes: "And truly, as for those people who first ventured upon the eating of flesh, it is very probable that the sole reason of their doing so was the scarcity and want of food." It would seem, therefore, that at certain periods of man's existence, he might have perished from starvation but for his adaptability to an unnatural diet, and that, from dependence upon the fruits, the food best adapted to his constitution he was forced to become a hunter, an eater of other animals, and, at times, a cannibal. This adaptability does not, however, abrogate the law of adaptation, and there can be little doubt that the harmonious and healthful action of all the various bodily functions is best maintained by adherence to the particular dietary for which the physiological constitution of each animal is fitted.

Chapter VI
THE PROTEID SUPERSTITION

" Synthesis of proteid molecules is a factor of great importance in growth, since proteids form the chief constituents of protoplasm, but there is no reason to believe as various authorities have maintained, that the metabolic process consists wholly or chiefly in the synthesis and decomposition of proteid molecules. All the facts indicate that much of the energy of the organism comes from substances other than proteids, and that proteid synthesis is only one of many chemical transformations occurring in the organism."—*Senescence and Rejuvenescence*, Charles M. Child.

The need, or otherwise, of including in man's dietary a high ratio of nitrogenous or protein elements has been the subject of much discussion. It was Liebig's contention that foods might be classified in two main groups, the *carbo-hydrates* (starches and sugars) and the fats for the production of heat in the body, and the *proteids* for the production of muscular energy. It was a bad guess, but, thanks to the influence of Liebig's name, it was very generally accepted, and dietaries were based upon the assumption that the amount of physical strength a man could put forth depended in a large measure upon the amount of nitrogenous (protein) food he consumed.

That Liebig was in error was conclusively proved by an experiment made in 1865, when two observers, Fick and Wislicenus ascended to the summit of the Faulhorn (1,956 metres). The quantity of proteid used up during a given

time can be calculated by estimating the amount of nitrogen in the urine, and this method was adopted, the urine being collected during the six hours occupied by the ascent and the six hours succeeding.

Wislicenus had oxidised 37 grams of proteid which is calculated would produce 250 heat units, or the equivalent of 100,000 kilogram-metres of work. As he had raised his own body, weighing 76 kilogrammes, to a height of 1,956 metres he had performed work representing 76×1956 or 148,656 kilogram metres ; in addition to this the movements of his heart and respiratory muscles—representing a considerable expenditure of energy—must be taken into consideration, making the total much higher. It was evident that an amount of energy much over 50,000 kilogram-metres had been expended above what was represented by the nitrogen in the urine.

If a comparison be made over several days of the intake and output of a man who is working at alternate intervals, it is found that the increased energy put forth on the working periods is represented by an increased oxidation of *carbonaceous* elements, and that the nitrogen excretion either remains the same in quantity or is only slightly increased. Where there is an increase it may be due to the wear and tear of the muscle tissue, but it bears no

relation to the amount of energy expended. It is apparent that the muscles of our bodies derive their energy from carbo-hydrates, fats and proteids.

The proteins have exercised a great fascination over the minds of chemists, and they are not only " the most important substances that occur in animal and vegetable organisms," but their metabolism is the most characteristic sign of life. The complexity of the protein molecule is enormous.

" Life is closely associated in some way with the substances we call proteids. These are formed in all organisms, and, so far as we know, nowhere else. Excepting water, they are the chief constituent of the visible substance characteristic of organisms, *i.e.*, protoplasm."[1]

The proteins are highly complex compounds of carbon, hydrogen, nitrogen, sulphur and oxygen, but they vary very much in their elementary composition in the relative proportions of their constituents.

It has been assumed by physiologists that the combustible portions of the food are built up in combination with oxygen into the living protoplasmic material of the cell, the result being a highly unstable molecule having great potential energy. But, as Child points out, " the ' living substance ' is not a substance of

[1] Charles Manning Child.
[1] Ibid.

uniform definite molecular constitution ; such a substance would not be alive. It is rather a substance in which some of the labile molecules are continually undergoing transformation, *i.e.*, life itself consists in chemical change, not in chemical constitution."

That proteins constitute a most important factor in the building up of the body tissues is certain, for they are the chief elements of protoplasm. The pabulum provided by nature for young and growing animals, such as milk and the white of eggs, is rich in proteids, and the milk provided for a rapidly growing animal like the calf contains more protein than that supplied by the human mother for the comparatively slow-growing infant.

To argue, however, as has been done, that life can only be sustained upon a diet rich in proteins is to ignore facts which face us on every side.

One of the most striking facts which controvert the idea that a high-protein diet is essential to strength is the comparatively small proportion of protein that is supplied by the food of the herbivora. Here is a group of animals including the hippopotamus, rhinocerous, elephant, camel, bullock, horse, reindeer, etc., with powerful frames and strongly developed muscles, capable of prolonged exertion, the very class that would seem to need the

most sustaining food. Yet none of these animals are flesh-eaters, nor do they subsist on vegetable foods rich in proteins.

If we come to a class of animals nearer to man himself—the gorilla and larger apes, their food consists of fruit, roots, and the tender shoots of trees, yet their physical strength and activity have excited the wonder and admiration of travellers.

Among these the gorilla (*Troglodytes Gorilla*) is, for its size, one of the strongest animals known. Prof. P. Martin Duncan points out that, " living on such nice things as sugar-canes and pineapples, the gorilla has a long and well-formed tongue to taste them with."

The gorillas, he tells us, may be seen sitting on a branch resting their backs against the tree trunk munching fruit, whilst the young gorillas are at play. No negro willingly approaches the tree in which the male gorilla keeps guard, even with a gun. A negro showed the commander of a Bristol trader a gun barrel bent and partly flattened by a wounded gorilla.

" The strength of the gorilla is such as to make him a match for a lion, whose strength his own nearly rivals. Over the leopard, invading the lower branches of his dwelling-place, he will gain an easier victory ; and the huge canine teeth, with which only the male gorilla is furnished, doubtless have been given

to him for defending his mate and offspring."[1]

"The male gorilla is literally king of the African forest. . . . . The lion of South Africa cannot compare with him for strength and courage. I knew that we were about to pit ourselves against as animal which even the leopard of these mountains fears ; and which, perhaps, has driven the lion out of his territory, for the king of beasts, so numerous elsewhere in Africa, is never met with in the land of the gorilla."[2]

In the light of such facts it has been all along evident that the importance of proteins as a source of strength has been over-estimated, and that, at least, it must be admitted that the muscles of the body derive their energy from other food elements or that it is possible for the chemical processes of the animal system to convert one food element into another. That such processes do occur is well-known. Bees are able to make wax from honey or sugar, and in the ripening of cheese, which is brought about by the agency of low organisms, the proteids are converted into fat. Fly-maggots hatched on a blood-clot will when full-grown be found to contain ten times as much fat as there was previously in the eggs and blood-clot together, the maggots having converted the albumen into fat.

[1] P. Martin Duncan.
[2] Paul Du Chaillu.

Groups of well-intentioned scientific workers have been for some years, and are still occupied with the investigation as to the influence of various artificial foods upon the health of mankind. The assumption which would appear to be the basis of most investigations of this kind, ignores the principles stated above, and it is apparently taken for granted that a cooked diet of flesh and vegetable foods is natural and proper to man. It would not appear that it occurs to scientific investigators, with a very few notable exceptions, that the present dietary of civilized man is fundamentally wrong. Thus it is that of all the various works written upon dietetics not one can be taken as final and authoritative, and that nearly every one of them becomes obsolescent almost from its date of publication.

Scientists of the Victorian era wrote learnedly upon " proteids," " carbohydrates," " peptones," etc., and it was generally assumed that the nutritive value of any particular food depended upon its content of nitrogen. Voit's estimation of the necessary amount of proteid was 145 grams, whilst Atwater reduced the figure to 125 grams, and Chittenden to 44·9. Later writers have, however, expressed more modified views, but the present-day practice of estimating nutritive values in ' calories ' altogether ignores the physiological adapta-

bility of a particular food to a particular animal, and neglects to take into account those subtler elements which appear to be of vital importance to health, but are essentially modified, or altogether destroyed in the process of cooking. The method of calculating food values upon thermal units may easily lead one to altogether false conclusions. It may have, ultimately, to be replaced by some system which ranks the physiological adaptability of a food to a particular organism as a more important factor than heat measurement.

Writing in the *Journal of the American Medical Association*, H. D. Chapin criticises the assumption that nutritive processes depend solely upon the oxidation of food, and that the heat given off is the result of this oxidation is the sole measure of the value of the food. Numerous experiments have proved that the number of calories a food yields on oxidation is not at all an indication of its nutritive value.

"Heat or energy may be produced by chemical cleavage as well as by oxidation. Heat may be a degradation of energy; and in the human body it is an excretion. Heat measurement alone is not a safe guide for the calculation of food values. This is specially true at the beginning of life, when growth is the all-important factor. The foods that *build*, rather than those which readily undergo oxidation,

must be properly gauged if a healthy development is to be ensured. A false theory does harm when it points in the wrong direction. It is a question whether it is not time to weigh carefully the thermal unit theory of feeding, and restrict or partially abandon its use. To take its place a system of teaching must be constructed based on a knowledge of the physiological properties of the various food elements, and recognition of the fact that there are mixed types of metabolism. Some form of biological testing of foods must be elaborated if an always reliable standard of nutrition is to be established."[1]

Most of the experiments on proteid feeding have been made upon dogs, and hence the results are misleading, for the dog is a carnivorous animal and is naturally adapted to a dietary rich in proteids—the flesh of other animals. Wolves and wild dogs live exclusively upon such food, whereas man, being naturally a frugivorous animal, any comparison between the two is valueless. Where the experiment has been made of feeding men exclusively upon proteids digestive disturbances have followed, and it has had to be abandoned.

Moreover, it has been found that, even in the case of the dog, carbonaceous food reduces the need for proteid, as, if fat be given at the

[1] *Jour. Amer. Med. Assoc.*, 1911, 73, 1911.

same time, the animal requires about 7 per cent. less proteid in order to maintain a nitrogenous equilibrium.[1] It is evident that a part of the energy required is drawn from the fat which thus replaces a portion of the proteid. Where carbo-hydrates are given the effect is still more striking, about 10 per cent. less proteid being required to maintain a nitrogenous equilibrium. If a large amount of fats and carbo-hydrates be given the equilibrium may be maintained on an amount of proteid food which only just corresponds with the minimum nitrogenous secretion such as occurs, for instance, when food is withheld altogether.

What really struck a blow at the theory that a diet rich in nitrogenous elements was essential to strength were the experiments of Chittenden. Voit, the German chemist, as a result of experiments upon dogs, which were as misleading as the results of all experiments upon animals must necessarily be when applied to man, came to the conclusion that the daily requirements of proteid for man were 145 grams. Moleschott calculated the amount at 130, and Atwater at 125.

Kumagawa found 54.7 grams of proteid sufficient, his intake being 8.75 of nitrogen and his output per fæces and urine 8.09. Hirschfield maintained a 15 days equilibrium of

[1] A balance between the intake and the output.

nitrogen with 45 grams of proteid, and Chittenden found 44.9 proteid sufficient with a total fuel value (calories) of 1,606 grams.

Now it might be argued that whilst experts were discussing the subject the best course for the practical man to adopt was to make sure of getting a sufficiency of proteids, even if he erred on the right side and partook of an excess.

Voit, however, regarded it as a sound general principle that the smallest amount of proteid (with a ratio of non-nitrogenous food added) that will sustain the bodily vigour is the ideal to be aimed at. Nor is it merely a negative result that follows the ingestion of an excess of proteids. These substances yield, when oxydized, a row of crystallised nitrogenous products which ultimately pass out of the body through the kidneys. Prior to their excretion such " toxins " float about through the body, and may easily exercise a deleterious influence upon the system, or, being temporarily deposited, may exert some specific or local influence that calls for their speedy removal.[1]

" We have been taught to believe," remarks Chittenden, " that the healthy adult under ordinary conditions of life needs for the maintenance of health, strength, bodily and mental vigour, about 118 grams of proteid

[1] Chittenden.

daily. This amount of albuminous food, if metabolised, means at least 16 grams of nitrogen in the urine in the form of urea, uric acid, creatinin, purin bases, and other nitrogenous products more or less clearly related. Under the stress of modern conditions and following the dictates of an acquired taste, the daily intake of proteid food in many individuals, at least, far exceeds the above figures with an increase of proteid katabolism equal to 18 or more grams of nitrogen in the 24 hours' urine. When we re-call that these 18 grams, or more, of nitrogen in the urine reach the final stage of urea, etc., only by passing through a series of stages, each one of which means the using up of a certain amount of physiological labour which the daily handling by the body of such amounts of proteid food entails."

To put it briefly, every grain of proteid beyond the actual physiological requirements of the system is an incubus, and a dangerous incubus at that. It is far more injurious than an excess of carbo-hydrates (starch foods), for these latter ferment whilst proteins putrefy. Fermentation is attended by the production of simple acids, whereas putrefaction produces deadly poisons.

It has generally been held by farmers and breeders of stock that a cow in full milk should have a high protein ration, and it is usually

recommended that a larger proportion of protein should be included in the dietary of nursing mothers. In a recently published investigation,[1] however, it was found that the addition of a quantity of caseinogen to the diet of a nursing rat, caused the baby rats to die though the mother remained, apparently, in good health.

The litters were strong and healthy at birth and were born of healthy mothers. The mothers were fed on a mixed diet during the period of gestation. A rat can rear 13 or 14 young, but the number was reduced to six to avoid any undue strain on the mother. When caseinogen was given to the mother rat (5.0 g. to 15.0 g. of bread) the litter did well until about the eleventh or twelfth day, when they ceased to gain any appreciable amount, then lost weight and died.

Other proteins were used with similar results.

These results are the more remarkable, inasmuch, as it might be assumed that the period of lactation was precisely the time when even a superabundance of body building elements could not only be tolerated but utilised with advantage.

" Synthesis of proteid molecules," writes Child, " is a factor of great importance in growth, since proteids form the chief con-

[1] *Biochemical Journal*, Vol. xv., p. 140, 1921.

stituents of protoplasm, *but there is no reason to believe, as various authorities have maintained, that the metabolic process consists wholly or chiefly in the synthesis and decomposition of proteid molecules.* All the facts indicate that much of the energy of the organism comes from substances other than proteids, and that proteid synthesis is only one of many chemical transformations occurring in the organism."

Dr. Hindhede, a Danish physician, declares that the orthodox ideas on nutrition are built " on sand and nothing but sand," and he found that by living chiefly on butter, bread, potatoes, sugar and fruit, he was able to take vigorous physical exercise without that feeling of tension and sluggishness which usually follows the consumption of a beefsteak.

The author's experience has been similar. He had always felt that in the light of the facts which stare us all in the face—the nutrition of other races of man and other animals (lacking neither in physical strength and vigour), the standards of the manuals of physiology were of little value. He, therefore, never troubled overmuch as to maintaining a high protein ration in his own dietary.

He was never partial to pulse foods, and he had observed that his health was at its best when he subsisted upon green vegetables, roots, tubers and fruits, with bread and butter and

occasionally a little cheese, a dietary that would certainly be condemned as insufficient by the advocates of a high ratio of proteids.

Chapter VII

THE EVILS OF EXCESS

"Eating is an agreeable process for most people, and under the influence of very small temptation, or through undue variety furnishing a source of provocation to the palate, a considerable proportion of nutritious material above what is required by the system is apt to be swallowed."

Diet in Relation to Age and Activity, Sir H. Thompson.

One of the disadvantages of civilised life is the fact that the supply of food available for each individual bears no definite relationship to his particular physiological needs, and is, in fact, only limited by the means he has at his disposal to pay an equivalent in money value.

Unless, therefore, civilised man exercises his judgment and self-denial and deliberately fixes a point at which the process of eating shall cease, there is more than a possibility that he would partake of a quantity of food quite in excess of his natural requirements.

Any tendency on his part to eat to excess is encouraged by the art of the cook which aims at preparing food in such a manner as to tempt and excite the appetite. The French, who excel in the art of cookery, have a saying; "L'appetit vient en mangeant," suggesting that the tempting flavour of a well-cooked dish creates a false appetite by exciting the gustatory nerves. The more successful the cook proves

himself as an exponent of his art the higher the value attached to his services, and the greater the demand for them.

It is generally admitted that the habit of eating to excess is injurious—the difficulty lies in the fact that no two persons hold identical views as to what constitutes excess. Nor does a reference to authorities help to a practical solution of the problem, as the most divergent views are held by various writers on diet. There is, however, a general concensus of opinion that the daily intake of food should bear a definite ratio to the wear and tear imposed by the physical and mental activities.

" It seems a fair inference," writes Dr. H. S. Williams, " that, if we could make the conditions in a human body so ideal that every cell to the remotest tissue should be bathed in a medium of blood and lymph containing just the right proportions of food, in just the needed quantity and supply also ideal conditions for the removal of waste products we should have an organism that would live on indefinitely."[1]

Physiologists have sought the solution of this problem by methods which, plausible, as they may seem, are based on false premises, and, therefore, unreliable as to results. One of the favourite methods of estimating the requirements of the human body—qualitative and

[1] *Adding Years to Your Life.*

quantitative, is to carefully observe the amount of waste material thrown off during a particular period—say, twenty-four hours. The exact amount of waste having been ascertained, it is assumed that a similar amount is required to replace what has been thrown off.

It appears to be generally overlooked that the subject of the experiment may have been in the habit of consuming an amount in excess of his physiological requirements, and that the "waste" represents "not merely an amount sufficient for the physiological needs, but includes any quantity that has been taken in excess thereof, and which has thus imposed upon the system an unnecessary expenditure of physiological labour which the daily handling by the body of such an excessive amount of proteid food entails."[1]

In animals living under natural conditions the balance is regulated by the pressure of hunger on the one hand and the effort necessary to procure food on the other. An animal whose hunger is satisfied will not usually expend its energy in seeking a surplus of food for immediate consumption, whilst one who is urged by the pangs of hunger will undergo great exertion to secure a meal.

"It may with truth be asserted that the greater part of mankind eat more than is

[1] Chittenden.

necessary ; and by being crammed and overfed in infancy, we are deprived of that natural sensation which ought to tell us when we have had enough."[1]

Boys and girls are encouraged to eat well and frequently, and, where plentiful exercise is indulged in, no immediate harm may follow. What may ensue, however, is the formation of a habit of eating to excess, and this habit tends to set up an apparent physiological demand.

Where a child is supplied with only a sufficiency for the normal needs of the system, the food, if well chosen, is likely to be thoroughly digested and assimilated, the system extracting as large a percentage of the nutritive elements as is possible. If an amount in excess of what is needed is supplied the processes of digestion and assimilation are not so perfectly carried out, but, when the habit of over-eating is formed, the desire for more may persist even when an amount sufficient for the actual needs of the system has been taken.

" The apparent demand for an elaborate diet is the result of education, and if simpler living were the fashion, there would be no loss of good appetite, and there would be a certain decrease in household expenses with a probable gain in good health."[2]

[1] C. F. Hufeland.
[2] *Principles of Human Nutrition*, W. H. Jordan.

Well-attested cases of fasting supply convincing evidence that the human body may be sustained for several weeks upon water. Yet it is a popular delusion that our strength depends almost from hour to hour upon the three or four meals taken during the day. A fasting man lives for some days or weeks after his last meal has been digested, supported by the combustion of the nutrient materials in his blood and tissues. When these are used up, Nature falls back upon the tissues of his body. At this stage, loss of weight occurs, but the most important organs are the last to be utilised.

The weight of a man or woman should really represent the normal tissues and organs of the body. Abnormal growths, the contents of tumours, purulent matter, calculus or stone, catarrhal matter, bronchial mucus or tubercle, all add to the weight, and, in some cases, very considerably.

Where the body is over-fed, such accumulations continue to burden the body, but they cannot be rightly considered as part of it. Many so-called " cures " are disguised forms of fasting, combined sometimes with massage or exercise, in order to burn up the excess matter more effectively. The " no breakfast " system, the two-meals-a-day system, the uric-acid-free diet, uncooked dietaries, etc., all tend

to reduce the in-take, and consequently, all can claim fair success as judged by results.

It is characteristic of men and women to be haunted by the fear of starvation, and to make the consumption of food at comparatively short intervals a habit, not easily to be distinguished from a natural demand. There are well-authenticated cases of abstinence from food for forty days and over, and the subjects of these self-inflicted experiments have afterwards recovered any loss of weight resulting from their fasts, and lived to a comparatively advanced age.

That many of the diseases of civilized life arise from repletion cannot be doubted. The value of abstinence which has been emphasised by some of the earliest writers on diet is endorsed by the latest scientific opinion as to autotoxæmia—the poisoning of the body by an excess of its own waste products.

The digestion, assimilation, and excretion of surplus food beyond what is actually required to replace the daily waste, imposes a considerable amount of work upon the system, taxing the energies rather than augmenting them.

Ten pounds overweight means to the man of fifty a reduction of six per cent. in his chance of longevity, twenty pounds means a reduction of thirteen per cent., and thirty pounds a

reduction of thirty-one per cent. Any increase over thirty pounds will almost certainly involve rejection by a Life Insurance Office.

" Excess of food rich in proteids causes, as Sir W. H. Allchin justly says, often lassitude, want of energy, headache, constipation, skin affections and feebleness of heart."[1]

Sir Michael Foster declares his opinion that the ingestion of food—and perhaps, especially of protein food—in excess of what is, under the best conditions, sufficient for maintenance and activity, can only be deleterious to the organism, clogging it with waste products which may at times be of a directly toxic nature.

" Many years ago," remarks Dr. Herman Weber, " I observed on myself that the reduction of the amount of food, especially meat and other flesh-food, to half the quantity I had been in the habit of taking, enabled me to do a larger amount of work without the feeling of mental fatique and exhaustion, and craving for tea and coffee one or two hours after a meat lunch."

The same writer states that " an unnecessary large amount of food, especially flesh-food, often, by developing disease of the minute blood vessels, impedes the flow of blood to the tissues, and causes in fact, their starvation,

[1] Quain's *Dictionary of Medicine* (1894), p. 131.

while a limited, but sufficient amount, which is often erroneously called 'starvation diet' improves and maintains their nutrition. Superabundance of food leads, in fact, more frequently in course of time to starvation of tissues than moderation which helps to maintain them in a healthy condition."

"I have a suspicion," writes Dr. Hindhede, "that a vast number of ailments, disorders of the stomach, nerves, liver and kidneys, not to mention gout—are to be attributed simply to over-feeding. I believe that, in this respect, we physicians have done infinite harm to our patients. When all these dyspeptic and weary people come to us complaining of drowsiness, debility, general disgust with life, how often have we not exhorted them to eat plentifully."

As Prof. Keith has pointed out, the human body is really a very complex machine of the internal combustion type. Its fuel or food is converted, within the system, into nervous and muscular energy. The skilful driver of a petrol-engine driven motor will avoid the use of too much fuel in the form of spirit, knowing as he does, that the result will be to carbonise the engine and impair the effectiveness of the working parts. If man applied his reasoning powers to the subject of diet he would recognise that a similar process follows when he indulges in a dietary too rich in quality or excessive in

quantity. It is the excess of elements which have not undergone the process of combustion that constitute the root-cause of many diseased conditions.

Chittenden insists that the smallest amount of food that will serve to maintain bodily and mental vigour, keep up the bodily strength, and preserve the normal powers of resistance to disease, is the ideal diet. Any excess over and above what is really needed for these purposes imposes just so much of an unnecessary strain upon the organism.[1]

And again, " moderation in diet, especially in the taking of proteid foods, means a great saving in the wear and tear of the body machinery. It must presumably mean greater freedom from many diseases in which individual organs such as the liver and kidneys are frequently involved."[2]

Voit, also, has emphasized the general principle that the smallest amount of proteid, with non-nitrogenous food added that will suffice to keep the body in a state of continual vigour, is the ideal diet. (See Chapter VI.)

There is a remarkable difference between the consumption of protein and other food elements in a state of rest or comparative inactivity as compared with sustained physical exertion.

[1] *Metabolism and Energy Transformations of Healthy Man during Rest.*

[2] *The Protein Element in Nutrition*, McCoy, p. 241.

Thus Benedict and Carpenter have shown,[1] as a result of experiments in the respiration calorimeter on fifty-five men, with an average body weight of 64·5 kilos, awake and sitting quietly in a chair, that the average heat production was 97 calories per hour.

	Calories per hour.
With seventeen men *asleep*, the heat production was	71
Men at rest, *standing*, the heat production was	114
Man at severe muscular exercise, the heat production was	653

Benedict has also demonstrated that a man of average size, weighing 66 kilos, at rest within the respiration calorimeter, expends in twenty-four hours about 2,270 calories, but quantities up to 600 calories per hour have been recorded as the output of energy by a professional bicycle rider.[1]

It would seem that this question as to the quantity of food required and the ratio of protein must be studied in relation to a number of factors such as age, temperament, nervous and muscular activities, occupation and general habits of life. Accurately to gauge the effect of these various factors presents almost insuperable difficulties, and to leave them out of calculation vitiates the value of the conclusions arrived at.

With the knowledge that excess of food is injurious, especially after middle-age, each

[1] *The Proteid Element in Element in Nutrition*, McCoy, p. 241.

individual should ascertain by experiment upon himself whether his health and strength may not be equally well supported upon a reduced quantity. Increasing years, sedentary habits, and hearty eating are the certain precursors of ill-health.

Chapter VIII

CELL-FOODS AND CELL-POISONS

"As the tale of our years increases and as our physical life gets less strenuous and active, we require less food, or, at any rate, a different kind of food; the strong nitrogenous foods, as meat become less called for, and, if taken beyond our needs, become poisons."—T. Bodley Scott.

Among the phenomena associated with certain diseases of civilized man is a hardening of various tissues and organs, and a deposition of earthy salts bringing about the condition known as calcification. The tissues are, in fact, gradually petrified by the deposit of earthy salts from the blood. Where a blood vessel is thus calcified, it loses its elasticity and contractility, its lumen is diminished, and it is transformed into a hard, rigid, brittle tube or "pipe-stem artery." Such an artery is partially protected against dilatation, but is predisposed to rupture. The nutrition of the parts supplied by such vessels is more or less impaired, and general calcification of the arteries of the lower limbs therefore predisposes to senile gangrene inasmuch as it renders the vessels less able to adapt themselves to the varying requirements of the circulation.[1]

The normal processes of nutrition depend upon the entire vascular system being in perfect condition, so that the free and unim-

[1] Green's *Pathology*, 12th edition, p. 65.

peded passage of the blood and lymph may be secured. Any part of the body that fails to receive its normal supplies of nutrient material, or to be freed from waste products, suffers a loss of vitality. The cutting off from the hair of the supply of blood which nourishes it by means of the roots leads to baldness ; a deficient circulation of blood in the vessels that supply the eye has a prejudicial effect upon the sight ; and, as is often experienced by persons with feeble circulation, a defective supply of blood to the feet results in chilblains. These constitute examples of the principle laid down, but it applies to every part of the body, and, if ignored or departed from, ill-health must follow sooner or later.

If we accept the principle that there exists a definite relationship between the physical constitution of each animal and its natural food, it is not difficult to understand that any departure from or modification of man's natural food should bring about a disturbance of the physiological processes.

In 1910 more than 100,000 persons died in the United States from diseases of the circulatory apparatus. Tuberculosis causes the death of only 160 persons per 100,000, cancer and other malignant tumours claim only 76, but no less than 185 fall victims to diseases of the circulatory system.

Dr. H. S. Williams, who quotes these figures, points out that "proteid (meat) poisoning makes brittle arteries, and a man with brittle arteries has the sword of Damocles hanging with perpetual menace over his head."[1]

There has been a marked increase in the disease known as arterio-sclerosis during recent years, and this is probably due to the greater use of stimulating foods and drinks, and the higher arterial pressure caused thereby.

The effect of flesh food in increasing the work of the heart has already been referred to (see Chapter III), and this fact, combined with the higher blood pressure, may have an important bearing upon the etiology of arterio-sclerosis.

A flesh-diet introduces into the system certain substances which act as poisons, and these poisons tend to accumulate, and to manifest their presence by various disturbances of health. On the other hand man's natural food, fruit, is not only free from these elements, but contains chemical substances which act as solvents and thus assist in throwing off material which is useless or injurious.

In the regular circulation of the blood throughout the tissues the blood plasma is brought into contact with every cell of which the bodily structure is made up, and the double

[1] *Adding Years to Your Life.*

purpose—the removal of waste material and the supply of fresh pabulum—is carried out.

On the return of the blood from the lungs it passes through the aorta and the systemic arteries into the smaller arteries (arterioles) and thence into the finer vessels, or capillaries. The walls of these latter are composed of a single layer of flattened epithelial cells through which the liquid portion of the arterial blood—the plasma, oozes out into the tissue spaces where the lymph is formed, and it is here that the nutritive elements are brought into contact with the cells forming the tissues of the body. Any excess of lymph is taken up by the lymphatics, by which it is carried to a point in the right sub-clavian vein, and again enters the blood-stream. A continual process of interchange appears to take place between the blood plasma and the tissue lymph, and it is upon the efficiency of this process that healthy cell life depends.

Dr. Alexis Carrel has kept for eight years the heart of an embryo chicken in a special glass incubator, and it continued to function and to grow.[1] He achieved this result by supplying nutritive plasma upon which the cells could feed, and by washing away waste products. All that he has done is to reproduce approximately outside the body the biological pro-

[1] *Daily Chronicle.*

cesses associated with cell-life within the body.

These two processes are complementary to each other. In early life, active metabolism enables the system to get rid of the waste products and to avoid any accumulation sufficient to interfere with the normal functions, but during middle life there is a slowing down of the vital processes, and the cells are not so easily supplied with fresh nutritive elements, or freed from waste products. The health of the cells suffers, and, with it, the vitality of the system is lowered, for it is obvious that the health of the body must depend upon the health of the aggregate cells of which it is made up.

Amongst the interesting speculations upon this subject of cell-life is the theory of Weismann, that certain single-celled organisms (so-called " infusorians " or " protozoans ") never die a normal death, but enjoy what he describes as a " potential immortality." Under the microscope a protozoan appears as a translucent particle of living matter, possessing powers of locomotion, and able to absorb particles of food and to increase in size until a maximum is reached.

At this stage it will be observed to become constricted in the middle until it resembles a dumb-bell, finally dividing into two parts, each of which resembles the original unit in all

points except size. These two parts move, and feed, and grow, until they in turn pass through the dividing process, which goes on successively until the progeny of the original protozoan will number countless thousands, each one of which constitutes a part of the unit with which we started.

Prof. Maupas, who studied a particular type of protozoan, carefully isolating one individual out of each successive generation, came to the conclusion that, after a time, the protozoan appeared to deteriorate in size, to lose its power of reproduction by fissure and to die.

Other biologists, however, challenged this latter view, and further experiments, notably those of Enriquez, Woodruff and Prof. H. S. Jennings, demonstrated that, where the supply of food is properly adjusted and the waste products are removed from the medium in which the protozoan exists, a strain of protozoan may be maintained in perfect health, without showing the slightest tendency to degenerate, for thousands of generations, and presumably for an indefinite period.

It is held that the cells of which the human body is built up do not differ essentially from the protoplasm that constitutes the body of the protozoan. The cells of the human body work, however, in groups, and make up the various organs of the body They thus lose

the independence enjoyed by the free *amœba* in a drop of pond water, and became dependent upon the nutrition conveyed to them by the arterial and capillary systems. Similarly they are dependent, for the removal of waste products, upon the capillaries, lymphatics, veins and excretory organs. "There is," writes Prof. J. S. Haldane, "no permanent physical structure in the cell: the apparent structure is nothing but a molecular flux, dependent from moment to moment on the environment."[1]

According to Prof. Minot, of Harvard, it is intrinsically impossible that such a vast aggregation of cells as that making up the human body should maintain the precise balance between the supply of food and the removal of waste material, and, this being so, perennial youth, a possibility for the *amœba* is a mere chimera in the case of men.

Prof. Metchnikoff's assumption that premature old age has its causation in the toxic products of the large intestine, only touched the fringe of the subject. Toxic products, the results of broken-down, or worn-out cells, exist throughout the system, and the question as to how far premature old age and death result from their presence is replete with interest.

[1] *The New Physiology.*

It is clear that the death of the various tissues of the body is not simultaneous with what we know as the " death " of the organism. As far as can be judged, the fragments of tissue under glass in Dr. Carrel's experiments would continue to live as long as the conditions (supply of suitable nutritive material and removal of waste products) were maintained.

Prof. Minot's declaration as to the impossibility of controlling the conditions which affect the vast aggregation of cells that makes up the human body, in the same manner as Carrel controlled the conditions affecting the small portion of protoplasm in his experiments, would appear to require modification. The life and vigour of the countless myriads of these cells is being influenced, daily and hourly, by several factors in some degree under control, and there is every reason for believing that amongst the most potent of these influences are the dietetic habits of the individual.

" The more we study protoplasm the more evident does it become that this ' substance ' is extraordinarily sensitive to the minutest changes in its environment. Take away, or diminish or increase the minute traces of calcium or potassium salts in the blood plasma, or the traces of various substances supplied to the blood by other organs ; or add traces of

certain other substances ; the reactions of the protoplasm are quickly altered, and its structure may be destroyed."[1]

Some years ago an attempt was made to prove that the advance of senility depends principally upon the accumulation of earthy material in the system. In a comparison of the bones, and various other organs and tissues of the human body in youth and old age, it was shown that the proportion of lime salts was greatly in excess in the latter as compared with the former period, and it was suggested that the accumulation of lime in the system is brought about by the consumption of food and water containing an excess of calcium. With a view to the retardation of this process, it has been urged that foods containing much earthy material should be avoided, and distilled water used in place of hard water for drinking purposes. Hard water contains carbonate of lime, carbonate of magnesia, and other mineral matter, and, as a result of its use, calcification occurs. Dr. Plowright published in the *Lancet* a map of Great Britain which showed that in the districts in which stone or calculus occurs the drinking water contains an excess of inorganic matter.[2]

The late Sir Henry Thompson remarks that

[1] *The New Physiology*, J. S. Haldane.

[2] See *The Lancet*, Sept. 4th, 1886.

"uric acid, we know, by experiments out of the body, to be soluble in alkaline solutions, but some of these have a more energetic solvent action than others," and he further points out that three-fifths at least of the urinary calculi are the products of a urine abounding in acid of which excess they are the expression[1] (See Chapter III). Prof. Dixon Mann calculates that 85 per cent. of calculi is of uric acid origin.

"We do not know," writes Mr. Alfred McCann, "in what manner certain minerals are deposited in the arteries, but we do know that the hardening of the arteries, brought about by these deposits, is the chief cause of old age."[2]

Fruits—as containing a relatively small proportion of earthy matter—constitute an ideal form of food, whilst cereal foods are not desirable. The stimulating properties of flesh food are probably associated with the process of calcification. The ideal dietary would appear to depend upon a selection of foods with a low content of ash or mineral elements.

[1] *Preventive treatment of Calculous Disease.*
[2] *The Science of Eating.*

Chapter IX

HOW FOODS ARE SPOILED

" It is by no means certain that preservatives in small quantities can prevent decomposition. They do stop putrefaction and thus destroy the signs by which decomposition is made evident to the senses. Their effect resembles that of tying down the safety valve of a steam engine."—*The Lancet*, quoted by H. T. Finck.

It is said somewhere in the Bible that " God made man upright, but they have sought out many inventions," and some of us must have been struck by the thought that most of the wonderful results of scientific discovery are ultimately directed to our hurt rather than to our benefit.

Thus it has come about that poison gas, considered to be a triumph of chemical research, is effectively used as an instrument of destruction, whilst the airship and aeroplane have been promptly devoted to the same purpose in warfare. And, if some optimistic reader remind us that " Peace hath her victories no less than war," we may admit, with a cynical smile, that he is right, when we look around at the various commercial uses (or abuses) to which the results of scientific discovery are put.

It is close upon a century since Frederick Accum startled the world by the revelations he made in his " Death in the Pot," but chemical

science has made great strides since then, and, if Accum were alive at the present day, he would need to write a veritable encyclopædia to deal comprehensively with his subject.

There is a good deal of point in the parable of the house-fly who was so utterly disgusted by the fact that every food he tasted was adulterated, that he decided to commit suicide and dashed off to the nearest fly-paper. But, alas, that fly-paper was adulterated like everything else, and the poor fly was foiled in his purpose, and had, perforce, to go on living his disconsolate existence in a heartlessly fraudulent world.

Since Accum wrote, the application of chemical science to the sophistication of food has become a danger that threatens the existence of the human race. Nature intended that man should support himself upon *fresh food*, and even, after Prometheus stole fire from Heaven, and the meat that God sends was manipulated by the professional gentlemen who are credited with being agents of the Devil, man's food was for countless centuries supplied in a comparatively fresh state.

To how small a degree can this be said to be the case to-day ? It is the exception for those living in great industrial centres to partake of food that has not been " preserved " for a considerable period, food that is devitalised,

denaturalised and deprived of its nutritive value—lacking the elements essential to the health and vigour of the human body.

" Meat," fish and poultry are kept in cold storage for weeks or months, and, although the process of putrefaction is suspended, such food cannot fail to be much more poisonous and unwholesome than it would have been if eaten in a fresh state. Poultry are put into cold storage with the entrails un-" drawn," and the the flesh is heavily tainted by contact with the poisonous products of putrefaction.

How many weeks or months the poultry remain in cold storage before being sold it would be difficult to say, but, as a writer in the *New York Times* remarks, " they taste as if they had been buried and dug up again," which is, after all, what has actually happened.

But cold is not the only " preservative " applied to our daily foods. They are rendered almost worthless by the process of " canning " or " tinning."

" Meat," poultry, fish, vegetables, and fruits so preserved and sold in enormous quantities, not only in large towns, but also in country villages, are displacing fresh foods, and lowering the vitality of the nation. For this class of foods is used in tens of thousands of homes, as well as in thousands of hotels, restaurants, tea-shops, boarding houses, etc., being found

from the proprietorial point of view economical and convenient.

The process of cooking before the tins are sealed destroys most of their good properties, and they are dead foods when the cases are sealed up at the factory.

" Packeted " food-stuffs, sold under fancy names, should be carefully avoided by those who value their health. " Egg " powders, blanc-mange powders, custard powders, jelly powders, and various preparations of starch should be let severely alone. Most " egg " powders contain not a single atom of egg. Like the custard and similar powders, they are concocted of the cheapest ingredients coloured with chemicals to please the eye.

To give these so-called " foods " to growing children is a crime against humanity. They would not keep alive a dog, or a pig—much less a human being.

Amongst the chemicals used to preserve food are—formalin, boric acid and salicylic acid, benzoate of soda, fluo-silicate of soda, sulphites and bi-sulphites of soda (aniline dyes), and a number of secret compounds that are sold to packers and dealers enabling them to doctor spoiled meats and other foods in such a way as to deceive the purchaser and consumer into the belief that they are wholesome.

The use of antiseptics or disinfectants to

conceal the fact that certain foods have already reached an advanced stage of decomposition is not uncommon, and a much advertised antiseptic with the odour of chloride of lime is recommended amongst other purposes for washing tainted meat or similar food !

The addition of chemicals to food is excused on the ground that they are added in infinitesimal quantities, and, therefore, cannot be harmful to the human system. This is an entire fallacy. Such chemical substances accumulate in the body, and bring about serious injury to the health, a fact that is usually overlooked because the effects are slow in making themselves manifest, though they are none the less deadly in the long run.

If a pound weight be placed upon a pair of scales and an ounce of sugar be put into the opposite pan there will be no perceptible change in the respective position of the two sides. If a further ounce of sugar be added the scales do not manifest any change. *Even when fifteen ounces of sugar have been placed on the scale-pan no visible change takes place.* It is only when the final ounce of sugar is added that the pound weight is lifted until both the pans are level, and, if half-an-ounce of sugar over the sixteen ounces be added the sugar side of the scales will go down with a flop.

The pound weight can resist anything up to

just under sixteen ounces, but every ounce weakens its resistance.

A similar state of things prevails in the body, which can resist a slight or occasional departure from natural law, but it will not do to presume upon this fact. *For the powers of resistance to any bad habit or breach of physiological law can only act up to a certain point*, and when that is reached, all the physicians in the world cannot stave off the inevitable result.

Moreover, it must be kept in mind that *so many* preserved foods have added to them a small quantity of some antiseptic chemical, and, in one kind and another we are liable to consume a great deal in the aggregate, until the system cries out and broken health or actual organic disease follows.

Dr. Shepard, of South Dakota, framed a series of *menus* to demonstrate how easy it is to consume large quantities of chemical preservatives with one's daily meals :—

BREAKFAST.

Sausages containing Coal-tar dye and Borax.

Bakers' Bread containing Alum.

Butter containing Coal-tar Dye.

Canned Cherries containing Coal-tar Dye and Salicylic Acid.

Pancakes containing Alum.

Syrup containing Sodium Sulphate.

DINNER.

Tomato Soup with Coal-tar Dye and Benzoic Acid.
Cabbage and Corned Beef with Saltpetre.
Corn Scollops with Sulphurous Acid and Formaldehyde.
Canned Peas with Salicylic Acid.
Catsup with Coal-tar Dye and Benzoic Acid.
Vinegar with Coal-tar Dye.
Mince Pie with Boracic Acid.
Pickles with Copperas, Sodium Sulphate and Salicylic Acid.
Lemon Ice-cream with Methyl Alcohol. (?)

SUPPER.

Bread and Butter (as at Breakfast).
Canned Beef with Borax.
Canned Peaches with Sodium Sulphite, etc.
Pickles (as at Dinner).
Catsup (as at Dinner).
Lemon Cake with Alum.
Baked Pork and Beans with Formaldehyde.
Currant Jelly, Coal-tar Dye and Salicylic Acid.
Cheese, with Coal-tar Dye.

A large proportion of prepared and proprietary foods have had their value destroyed in the process of manufacture by the separation of the more nutritious portions. What remains in the preparations sold to the public possesses little real value in itself. This applies with particular force to cereal foods, and considerable attention has been directed to the subject in connexion with the disease known as *beri*

beri, which is attributed to the use of polished rice, and can be checked by replacing the " polishings " (or inner husks) in the dietary. Even the rice sold as " unpolished " is deficient in vitamins.

The same principle applies to the use of white wheaten flour, corn-flour, and all grain foods from which all but the starchy elements have been removed. The valuable elements which are present in the various grains represent an infinitesimal proportion, but they are none the less vital to health.

Until recently, the enzymes and vitamins were ignored by writers on diet, but, although their importance is now fully recognised, the public continues to purchase the attractively-packeted and well-advertised foods which fill the shelves of the grocer and provision dealer.

If half-a-dozen chickens were fed on white bread, polished rice, and similar foods from which everything but the starch had been extracted, and six others were fed upon the bran, the rice polishings and green food, there would be a marked difference in the condition of the two lots of birds in a month or six weeks.

The six chickens that were supplied with denatured foods would be ill-nourished and in very poor condition, whilst those which had been fed on the bran and similar materials and green food, would be in excellent condition.

What applies to chickens applies to children. Many children who are suffering in health—weak, ailing and fretful—would show a marked improvement if they were supplied with the food elements hitherto lacking. Many a " nervous wreck " would find out for the first time the true meaning of health and vigour, if he could be induced to abandon the use of butchers' meat, nerve tonics, etc., and regulate his dietary in accordance with Nature's laws.

Analysis of the various juices which perform certain important chemical functions in the body shows them to contain the very elements found in natural foods, and removed from nineteen out of twenty of the artificial preparations foisted upon the public.

ANALYSIS OF SALIVA (Frerichs).

Calculated for 1,000 parts by weight of mineral salts.

Water	99·1
Total Solids	45·9
Minerals	2·19
Potassium	457·2
Sodium	95·9
Iron Oxide	50·11
Magnesium Oxide	1·55
Sulphur....	63·8
Phosphorus	188·48
Chlorine	183·52

ANALYSIS OF GASTRIC JUICE (C. Schmidt).

Water	994·40
Total Solids	5·60

Mineral Salts	2·19
Sodium Chloride	1·46
Calcium Chloride	0·06
Iron	0·12

ANALYSIS OF MINERAL SALTS OF BLOOD SERUM (Cavazzini). Calculated on 100 parts of fluid.

Potassium Oxide	0·387
Sodium Oxide	4·290
Chlorine	3·565
Calcium Oxide	0·155
Magnesium Oxide	0·101

The potassium, calcium, iron, etc., shown in the above analyses are present in a highly complex *organic* form, and cannot be replaced by crude, laboratory preparations, or so-called "chemical foods."

It is usual for those who are interested in the manufacture of denatured foods to assure us that the removal of the branny portion is necessary because of its indigestibility. So far as the endocarp or inner husk of grain is concerned—the *outer* husk is almost always removed—the greater part is certainly not digested. *Nature never intended that it should be.* After being subjected to the digestive process, it parts with the valuable elements already referred to and finally passes out of the bowel.

In its passage through the intestines it serves the useful purpose of assisting the natural process of peristalsis, and, by its presence, renders the contents of the bowel less hard and compact, and more friable. It thus prevents

such disorders as constipation and maintains the healthy action of the bowels unimpaired. The success of "Natura" laxative biscuits in constipation depends upon the cellulose they contain. The use of over-refined foods is antagonistic to such healthy action, and can only benefit the vendors of pills and patent medicines.[1]

It cannot be too clearly understood that there exists throughout Nature a definite

[1] "No clinical symptom is more frequently encountered in the practice of medicine than constipation. The commonplace and obstinate character of the affection is perhaps responsible for the idea that constipation is a necessary evil rarely capable of permanent cure.

"As a result of this false and dangerous attitude the people are prone to look upon the condition with indifference, which allows them to be content with a certain degree of temporary relief too often brought about by the easiest means at their disposal, namely, the use of purgative drugs.

"This attitude is not only erroneous, it is harmful. Constipation is but a symptomatic expression of some underlying disorder, and any treatment to be efficient must be directed, not to the temporary relief of the symptom, but at the cause.

Dietetic errors are among the most general causes of constipation. These consist in food which is deficient in residue (bran) by reason of which the lower bowel is deprived of the mechanical and chemical stimuli necessary to promote intestinal activity.

"A diet suitable for constipation must be one that will furnish adequate stimuli to the intestinal mucosa by means of residue and the various chemical substances elaborated during the digestion."—Drs. John H. Musser and George Morris Piersol.

"All foods abounding in cellulose and which leave a considerable amount of its residue unnegotiated within the intestines serve to stimulate the propelling peristaltic action of this ballast, and to promote its passage onwards; in which way constipation is prevented, when the bowel energy has become torpid unless some aid of this kind is afforded. . . . . Furthermore, these vegetable foods, which are rich in cellulose, possess certain laxative properties due to the organic acids which they contain, and to the fermentative process they undergo within the bowels."—
W. T. Fernie, M.D.

adaptation between various organisms and their food, and that man is no exception to this rule. (See Chapter V.)

To the extent that man substitutes his own schemes for that of Nature, he is departing from that course which is best for his health and essential to his happiness. It is bad enough when we, individually and of our own volition, alter the character of the food we eat by separating certain elements, or subjecting it to a chemical process in the kitchen. But it is very much worse when we permit ourselves to be exploited by commercial firms who seek to aggrandise themselves by trading on our ignorance of all matters relating to diet.

If every intelligent person were to set his face resolutely against the use of prepared and denatured foods, and to insist that, whatever he ate, be it fish, flesh or fowl, vegetables or fruit, should be served to him in a fresh condition, without being first subjected to any artificial process of preservation, the health of the community would undergo a striking improvement.

Chapter X

THE COW AND HER PARASITE

"It has been ascertained by experiment that if two cows, the one nursing a calf and the other giving no milk, receive in their food a quantity of poison sufficient to cause death, the latter cow will be killed by it, while the calf of the former will be killed and the mother will escape."—Sylvester Graham.

Nearly all animals are afflicted with parasites, and civilized man is the parasite of the cow.

The use by man of the milk of various animals, including camels, reindeer, mares, asses, cows, sheep, goats, etc., must have commenced long before recorded history. The legend of Romulus and Remus being suckled by a she-wolf is only one out of many similar stories. Vicarious maternal care is not an unheard-of incident, and it may very well have occurred to primitive man to apply the sucking child to the teats of some other animal.

At a later stage he would learn to draw the milk into some receptacle and to drink it like any other fluid.

Under the rough domestication of the early ages the animals would be comparatively healthy, and the milk as freshly drawn from the udder was probably free from disease. It might become contaminated at a later stage and, in hot countries, it would rapidly turn sour.

With the growth of communities and the greater risk of unhygienic conditions it must have been very difficult to keep milk from contamination, whilst the condition of the animals supplying it left much to be desired.

Half-a-century ago it was a common thing to see one or two cows partitioned off from milkshops in London, the strong odour from the ill-kept cowshed permeating the whole premises. In the Mall between St. James's Park and Carlton House Terrace two or three cows used to stand, and the author can remember his father buying him a glassful of warm frothy milk fresh from the cow, which he drank on the spot.

The milk supplied by a healthy cow, however, for the sustenance of its calf, is very different from the unnatural secretion of the mammary glands, the production of which has been prolonged far beyond the period intended by Nature, and it is scarcely to be wondered at that the health of so many children in civilized communities is a cause of the gravest concern.

Frederick Accum drew attention to the subject a century ago, and quoted from a pamphlet by the Hon. F. Byng, a description of two cowsheds in Westminster :—

" Forty cows are kept in them, two in each seven foot of space. There is no ventilation save by the unceiled

tiled roof, through which the ammoniacal vapours escape into the houses. . . . Besides the animals there is at one end of the sheds a large tank for grains, a store place for turnips and hay, and between them a receptacle into which the liquid manure drains and the solid is heaped. At the other end in a capacious vault with a brick partition, one division of which contains mangolwurzel, potatoes and turnips, and the other a dirty yellow, sour-smelling liquid called brewers' wash, a portion of which is pumped up and mixed with the food of the cows. . . . In summer-time the smell is most offensive. Decomposition of the vegetable matters in the vault is also stated to be frequent, and the smell thence arising insufferable. At the opposite side of the houses, in the same street, is another shed with even less possibility of ventilation than in those just described. Thirty-two cows stand side by side, two in each space of seven feet as above. In Marshall Street there is a third establishment containing twenty-eight cows. In a wall on one side, overlooking a yard in which as a slaughter-house, are several grated openings, but they are carefully covered with pieces of sacking, as if to prevent all possible admission of air. In these are receptacles for vegetables and grains as before. The manure tank holds twelve tons and that for brewers' wash 600 gallons. It is to be remarked that even the manure, from the nature of the food supplied to the cows acquires a peculiarly unhealthy and offensive odour, altogether dissimilar to that from farm-fed animals. In this atmosphere, reeking with all these pestiferous effluvia, the poor creatures are kept close shut up at night and day, till their milk failing, they are consigned to the butcher. The effects of this system of feeding, impure air and deprivation of all exercise, are thus described

from actual inspection of four cows which the keeper said were suffering from the old disease.

There was inflammation of the mucous membrane of the mouth, fauces and gullet, a catarrhal discharge from the nostrils, and such prostration of the muscular system, as to render the animals unable to remain in a standing position for any length of time. The mucous membrane of the mouth is sometimes so blistered as to prevent the animals from taking food. Swellings in the udder appeared attended by a change in the quality and a deficency in the secretion of milk. The feet also became much diseased and swollen ; general emaciation followed in which the animals continued for an indefinite period, or till death. Four months prior to this visit the owner of one of these sheds lost thirteen cows by disease.

A Dutch cow was pointed out which was evidently in a state of marasmus, her head hanging nearly to the ground ; the horns cold ; the ribs staring through the hide on each side of the emaciated body, on which the hair bristled and stood erect. *Notwithstanding this prostration of the vital powers, the cow was regularly milked with the others, furnishing a daily supply of ten quarts.*

Dr. Normandy in his evidence before the Parliamentary Committee, tells us that he witnessed in Clerkenwell a spectacle which prevented him from tasting milk for six months. He saw about thirty of forty cows in the most disgusting condition one can possibly imagine, full of ulcers ; their teats in a most horribly diseased, ulcerated state, and their legs full of tumours and abscesses ; in fact it was terrible to look at. A fellow was

milking these poor cows in the middle of all this purulent abomination.

The progress of hygiene and various legislative enactments have had the effect of abolishing such conditions as are above described, but the fact remains that the whole process of " milking " is unnatural and disgusting.

Under natural conditions the mammary glands of the cow are only active during the period of suckling its calf, and their continued activity is abnormal. A healthy cow would cease to produce milk, but by special breeding and feeding an abnormal type of animal may be made to produce a regular secretion of the mammary gland which is dignified by the name of milk though it is, in reality, a very different fluid as compared with what is naturally supplied to the calf. Milk produced under these circumstances is really as much an *excretion* as a secretion, and the disordered health of the cow cannot fail to affect it prejudicially.

The udder of the cow is also liable to become diseased, and traces of blood and purulent matter may be found in the milk on microscopical examination. The sediment of milk will frequently be found to contain hairs, scabs, portions of manure, and a variety of pathogenic and non-pathogenic bacteria. The

much-advertised tuberculin test now appears to be valueless, and to offer no protection to the consumer.

Pure milk from a healthy cow, is, however, liable to contamination before reaching the consumer. By a wise provision of Nature the secretion of the mammary gland passes from mother to young without coming into contact with the air, and is therefore free from risk of contamination. There is no exception to this rule in the case of any animal, and it has not occurred, even to man, to make it a custom to draw off the milk from the human mother and administer it to the infant by means of a bottle. Were such a practice to become general, there would be not less danger in the administration of human milk to children than exists in the case of cows' milk.

There are many ways in which milk may become contaminated, and, of these, Claypon enumerates nine.

1. From the cow herself, either from the udder or from some other parts of the animal.
2. From the milker.
3. From the cow-shed, either from the air, the walls, the floor, the bedding, or the food.
4. From the milk-pails.
5. In the process of filtering and cooling.
6. From churns or bottles.
7. In the process of transit from farm to dairy and from dairy to customer.

8. In the course of manipulation at the dairy.
9. In the home of the customer.

The udder of the cow is very liable to disease and milk may be infected at its source. The cows, unless cleaned, usually have their hind quarters contaminated with fæces and urine. The greater part of the dirt, *i.e.*, sediment, which is found in milk is well-known to be mainly composed of fæcal material.[1]

A practice exists amongst dirty milkers of moistening their hands with their own saliva when milking. By this means any organisms present in the milker's mouth or throat will be transferred to his hands. In the process of milking there will be an accumulation of bacteria, epithelial debris and dirt, both from the hands of the milker and from the teats of the cow, and a large proportion will find its way into the milk-pail.

Some of the diseases which have arisen as a result of contaminated milk have been traced directly to disease in the milkers.

From the dust and filth of the cow-sheds it is practically impossible to keep milk free.

The pails or other utensils are not always kept as clean as they should be, and, even after they have been cleansed, dust is allowed to fall into them. During the conveyance of milk from the milk-shed to the customer it is

[1] See *Report of Royal Commission on Tuberculosis.*

liable to contamination in a variety of ways, and, by the time it is delivered at the home, it is frequently a very dirty and dangerous liquid. It is, however, further contaminated by house-flies and other insects, being as a rule, left to stand in uncovered jugs or other vessels and exposed to the dust-laden air of the living room.

In summing up his investigation upon the bacterial contamination of milk Houston remarks :—" The whole history of milk, from start to finish, from secretion by the cow to ingestion by the human being, is fraught with ' potential risk ' to the consumer."[1]

The bacterial content of raw milk, when it reaches the consumer in the course of the daily milk round will usually have reached at least one million organisms per cubic centimetre (about 18 minims) and will often be many times that figure.

A recent investigation made on behalf of a London newspaper brought out some startling facts upon this point.

An analysis of samples purchased from retailers showed that 25 per cent. were adulterated or deficient in fatty or non-fatty solids.[2] What was much more serious that samples of milk purchased in various districts

[1] *Report to the London County Council*, 1905.

[2] *Daily Express*, Oct. 19th, 1921.

of the Metropolis were heavily contaminated with bacteria :—

1. Notting Hill	....	....	5,840,000 per c.c.
2. Walworth	....	....	1,025,000 ,, ,,
3. Whitechapel	....	....	1,025,000 ,, ,,
4. Shoreditch	....	....	1,180,000 ,, ,,

One c.c. (cubic centimetre equals about eighteen minims or a teaspoonful if liquid.)

The temperature of the day on which the above samples of milk were taken was low, and the increase in the number of bacteria would be much greater in hot weather.

The *bacillus coli communis* was present in all the samples. The source of this bacillus is the intestinal tract of the cow, or it may be introduced into the milk by the dirty hands of the milkers or from dirty vessels. It is held to be capable of causing appendicitis, inflammation of the bladder, gall-stones, enteritis, colitis, etc.

Dr. Mary Scharlieb, of St. Mary's Hospital, declares her opinion that "the dangers of dirty milk are almost incalculable."

Apart, altogether, from its dirtiness, there are marked differences between human milk and cows' milk which make the latter unsuitable for infants. The protein of milk is a mixture of several nitrogen compounds, casein, albumin, globulin, etc. These bodies do not exist in the same proportion in cows' milk and human milk, the proportion of protein in

cows' milk being 80 per cent., which is nearly twice as much as human milk. The soluble bodies, such as albumin and globulin are proportionately larger in human milk. Nor is the casein of cows' milk identical with that of human milk, there being a difference in the proportion of the several elements of the casein from the two sources, especially of the phosphorus and sulphur.

Cows' milk contains more than ten times as large a proportion of volatile acids as human milk, though the proportion of oleic acid is much greater in the latter.

The milk industry is well-organised and very profitable and it is not surprising that every effort should be made to maintain the superstition that milk is indispensable. Enormous sums are paid by local authorities for grants of milk to poor families where there are young children, a very doubtful benefit in view of the many dangers associated with contaminated milk.

Dr. Waller, in a recent lecture,[1] remarked that " it is a mistake to suppose that children of the slums are unhealthy. An enormous proportion of them, between three and six years of age, are magnificently healthy, although brought up under the most unorthodox conditions. The reason of this, he

1 To the National League of Health.

declared, is that cows' milk has played no part whatever in their early diet. They were breast-fed entirely for the first five or six months. Not a hundredth part of the present bottle feeding of infants was necessary.

If civilized man desires perfect health, and freedom from the risk of infection for himself and his offspring, he must cease to live a parasitical life at the expense of the cow.

Chapter XI

MAN'S IDEAL FOOD

" Soft acorns were their first and chiefest food,
And those red apples that adorn the wood.
The nerves that joined their limbs were firm and strong
Their life was healthy, and their age was long. . . .
Returning years still saw them in their prime ;
They wearied e'en the wings of measuring time :
No colds, nor heats, no strong diseases wait,
And tell sad news of coming hasty fate :
Nature nor yet grew weak, nor yet began
To shrink into an inch the largest span,"

Lucretius (Creech's translation).

Were it announced that a scientist had, after many years of painstaking research, discovered a food preparation which combined in a portable form the whole of the elements essential for nutrition of the human body, that it supplied both food and drink in the proportions required, that it possessed the most exquisite flavour, that is was made up in a portable form with a tough waterproof covering and that it could be made available for use at any time without a tin-opener or any similar implement—were such an announcement to be made in the columns of the press, everyone would be remarking what a wonderful achievement of science it was, and public companies, with enormous capital would be formed to exploit the idea, and to extend the facilities for making such a boon accessible to mankind in every part of the world.

Yet, curiously enough, that which no inventor has done has long ago been achieved by Nature in the form of edible fruits.

For, what more easily portable food can be conceived than an apple or an orange? Millions of these delicious fruits travel to this country from the Antipodes in nothing but a thin paper wrapper and a rough wooden case, their covering being impermeable to water or dust, and they reach the consumer in an uncontaminated state.

The skin, though tough enough to afford reasonable protection from injury to the interior, is easily removable by the nails and teeth of the animals whose natural food is fruit.

The interior consists of the purest elements of food, whilst the colour, texture, odour, general appearance and flavour is highly attractive.

If an orange be cut in half with a sharp knife, it will be seen that the rind consists of two parts—a thin outer skin, and a tough white pith-like material. The yellow outer skin contains numerous small cells filled with an oil possessing powerful antiseptic properties. The inner portion of the orange consists of a number of sections, which may be easily separated, and if pulled to pieces, will be found to consist of a vast number of tiny cells

containing the juice. The sections are the fully matured cells of the ovary. They are enclosed in a thin semi-transparent skin, and on their thinner edge they are joined by a central white, pithy substance. The seeds, where they occur, will be found attached to this portion of the fruit.

By the use of a microscope it will be seen that the pith is made up of a number of small tubes which are filled with juice. The cut end of the fibro-vascular tissues through which the sap of the tree was conveyed to the fruit-cells, promoting their growth and the consequent development of the fruit may also be seen. They have the appearance of small dots in the central pith when cut transversely.

Analysis of the orange, when peeled, shows it to contain about 86 per cent. of water, 8 to 10 per cent. of sugar, citric acid, citrate of potash, albumen, cellulose, etc.[1] Cows' milk contains 86 per cent. of water and human milk 89 per cent.

As the late Dr. Herman Weber pointed out, apples have an old reputation for wholesomeness. Laurentius to whose work Sir W. Osler directed his attention, when speaking of permitted fruits, says :—" and especially those apples which have a marvellous propertie in curing melancolie."

[1] Church.

Apples, by their aperient effect, assist removal of fæcal matters, and thus prevent auto-intoxication. Apples contain a larger proportion of soda salts than pears, which are richer in potash salts.

By cooking, however, part of the fruit salts is lost, and with it some of the usefulness. . . It is assumed that apples as well as other fruits and vegetables contain in their raw state a kind of enzyme which is destroyed by cooking.

The banana contains less water and a greater proportion of nitrogenous matter than most fruits, and in its ripe state the starchy elements are converted into sugar.

Freshly-peeled bananas contain :—

	In 100 parts.	In 1 lb.
Water	73.9	11 oz. 361 grains.
Albumen	4.8	0 „ 336 „
Sugar and Pectose	19.7	3 „ 66 „
Fat	0.6	0 „ 42 „
Cellulose	0.2	0 „ 14 „
Mineral Matter	0.8	0 „ 56 „

Church, who gives the above figures, estimates that one pound of bananas might produce ¾ounce of the *dry* nitrogenous substance of muscle or flesh.

The various ingredients of fruit are obtained primarily from the air and from the soil, or, rather from the watery contents of the soil. An ordinary, well-drained soil is made up of

fine particles, each of which is surrounded by a film of water, in which certain salts are held in solution.

It has been proved by experiment that plants will grow without soil if weak mineral solutions are supplied to the roots. These solutions contain potassium, calcium, magnesium, nitrogen, phosphorus, sulphur, and a trace of iron in the form of soluble salts. The following is a typical formula that suits most plants :—

Potassium nitrate	1.0 gm.
Ferrous phosphate	0.5 gm.
Calcium sulphate	0.25 gm.
Magnesium sulphate	0.25 gm.
Distilled water	One to two litres.

If iron is omitted from the solution the formation of chlorophyll—the green colouring matter of leaves—is checked, but it is a curious fact that pure chlorophyll does not contain iron, though the presence of that element appears essential in some way to its formation.

From the roots of most plants fine root-hairs are thrown out and these force their way between the particles of soil in order that they may absorb the largest quantity of water. The watery solution held by the soil being of less density than the fluids contained within the substance of the plant, passes through the

cell membranes by a process known as "osmosis."

By the chemical action of the plant cells the various elements held in solution are built up into the tissues of the plant, and, together with the gases contained in the air, form the material basis of the stem, branches, leaves, flowers and fruit.

Van Helmont's experiment is well-known. "I placed," he says, "two-hundred pounds of earth previously dried in an oven, in an earthenware pot and planted a willow-slip in it, weighing five pounds. Within five years the willow-slip weighed one-hundred and sixty-nine pounds three ounces. The pot was regularly watered with rain and distilled water. The pot was large and buried in the soil; and, that it might be protected from dust, it was covered with perforated tin-foil. I did not weigh the leaves shed by the plant during the four successive autumns. At the end of the five years I re-dried the earth and found that it weighed the same amount of two hundred pounds, minus two ounces, which meant that *water alone had been sufficient for the production of one hundred and sixty-four pounds of wood, bark and roots.*"[1]

The substance of the fruit contains, in the purest form, the water and solids as shown in

[1] *Ortus Medicinæ*, page 109.

the analyses, but it contains, in addition, other elements which escape detection by chemical analysis, and the presence of which is only known by their effects. These substances are generally described as " vitamins," and fruits are, as a rule, rich in what is known as anti-scorbutic vitamins.

A writer in the *Journal of the America Association* states that, apart from the recognised value of fruits as anti-scorbutics, a reason why they may be used liberally in the diet is given in the new investigations of Osborne and Mendel. They have demonstrated that the fresh juices of the edible parts of the orange, lemon and grape fruit contain the vitamin frequently spoken of as water-soluble B or anti-neuritic vitamin. It is even hinted that orange-juice may contain some fat-soluble vitamin, in which case it will have been demonstrated to yield all the at present known types of vitamins.

Fruits also contain acids which play an important part in the human system, where they are converted into carbonates. As pointed out in Chapter VIII these acids supplied by fresh fruits act as solvents of certain injurious substances, the accumulation of which, in the system, is one of the causes of premature decay.

" The value of fruits consists in their alkaline mineral salts and feeble acids. Most

fruits are rich in potassium and calcium salts, which are united with the tartaric and malic acids that produce the agreeable flavours of the fruit. These feeble acids are quickly burned up and oxidized in the body into alkaline carbonates. It has been demonstrated on hundreds of occasions that these fruit acids exercise a wonderfully beneficent action upon the blood and kidneys."[1]

The value of fruit as a food is not sufficiently appreciated by the general public, it being customary to refer to it as " watery," whilst the rage for foods rich in proteins has diverted attention to other food.

The human body, itself, contains over 75 per cent. of water, and if we leave out of account the more solid parts—bone and fat, the percentage of water is even greater. A juicy fruit such as the orange contains the same proportion of water as milk. The chyle and lymph, by means of which the various tissues of the body are nourished, are comparatively thin and watery fluids ; and it may be safely asserted that more disorders arise from over-feeding and wrong feeding than from an insufficient quantity of food.

The idea that " solid " foods possess an advantage over those which contain water has no scientific foundation, for although water is

[1] McCann.

not so much a food as a medium for the conveyance of nutritive elements, the processes of nutrition cannot go on either in plants or animals without it.

The oily fruits, or nuts, however, contain nutritive elements in a highly concentrated form, and constitute a valuable source of food, especially in cold climates, and for those who are engaged in severe physical labour. They are rich in fat and proteids, and will keep in good condition for a considerable period. A mixture of almonds or Brazil nuts with raisins and oranges makes an ideal food combination, and one sustaining enough for any ordinary work, mental or physical.

Fruits supply man's needs in the purest and most healthful form, and are in every way adapted to the requirements of the human system. They should be cultivated on an enormous scale so that a plentiful supply might be within reach of the poorest.

The natural instincts of children lead them to prefer fruit to all other foods, and that the perversion of those instincts during their early years is productive of much physical and moral evil there can be little room for doubt.

The cultivation of fruit is without doubt the most enjoyable and healthful occupation in which men can engage, and when carried out

on scientific lines it is also one of the most profitable.

In districts on the Rhine it is not uncommon to see long lines of fruit trees bordering the public thoroughfares, and there is no good reason why indigenous fruit trees should not be similarly planted along the roads of Britain. It is, at least, paradoxical that, whilst the spectre of unemployment is hardly ever absent from our large cities, and fruit is scarce and dear, a large portion lies uncultivated, and land which might employ labour in raising crops is either left barren or given up to the grazing of cattle and sheep.

Chapter XII

THE PATHWAY TO REFORM.

"Fix upon that course of life which is best, and habit will render it the most delightful."—Pythagoras.

Many readers of this book will, no doubt, wish for information as to how its principles may be applied in everyday life. Habit and custom, not only in their direct influence upon our own actions, but also as reflected from the life of the community around us, make it difficult to initiate any very radical changes.

The man who has the temerity to turn his back upon established custom will find he has a lonely furrow to plough, and becomes somewhat of an Ishmael. Cases have come to the author's notice in which a purely fruit diet has been adopted, and has appeared to be sufficiently sustaining over long periods. It has usually been modified under pressure of circumstances, and the inconvenience in procuring a dietary so different from that of the general community.

A varied diet of fruit and nuts should be ample to supply the needs of man, woman or child. Such a dietary would give immunity from many of the ills that are associated with the usual habits of civilized life.

There are, however, a large number of cases in which some change is desired, but it is not practicable for various reasons to make so radical an alteration in one's habits.

In such cases the following suggestion will be found useful :—

The flesh of animals should be entirely avoided, and the quantity of milk should be reduced to a minimum.

Bread, cakes, porridge and all forms of farinaceous food should be reduced in quantity, and not eaten at more than two of the daily meals.

At least one meal each day should consist entirely of uncooked fruit, with nuts, and, at the other meals, salads or some vegetables (such as celery, lettuce, etc.) eatable in an uncooked form should be included.

For those engaged in active work, one egg a day may be included in the dietary, and this is preferably eaten *uncooked*, beaten up in a little water, milk or weak tea.

Tea and coffee should not be taken habitually, but treated as luxuries. They should, moreover, not be made strong. Real fruit juices,—not the chemical concoctions so much advertised,—are more wholesome, or, where a hot beverage to take the place of tea and coffee is required, a recently-introduced preparation, known as " Peeco " will be found excellent. An open-air life is essential to health.

The above suggestions will enable anyone to gradually feel his way to a more rational dietary, and will, of themselves, bring about improved health.

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